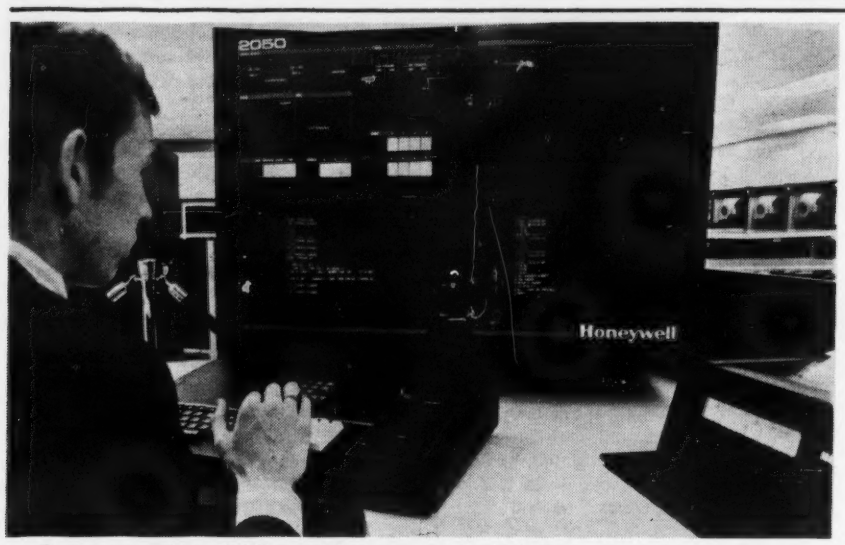
COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper – Second-class postage paid at Chicago, Illinois

Vol. VI No. 4 | January 26, 1972 | Price: $9/year



Operator monitors 2050 operation through dual displays. (CW Photo by F.J. Piasta)

New HIS 2000 Series Compatible With 200s

By F. Piasta and D. Leavitt
Of the CW Staff

WALTHAM, Mass. – Honeywell has introduced a Series 2000 line of medium-scale computers to complement its current Series 200 family. Many of the hardware and software enhancements of the Series 2000 are available to present 200 users.

Hardware enhancements include a data communications front-end processor, a visual communications control console and a disk system.

The new software provides enhanced multiprogramming capability, an optional data base management module and two forms of communications support, while providing an upward compatible system for currently existing HIS 200 application programs.

The Series 2000's five processors fit between the current Series 200 Model 115/2 and the Series 6000 large-scale systems.

Designed to be compatible with the Series 200, the 2000 offers the user lower-priced multiprogramming and smaller increments between models.

First Multiprocessor

The 2088 is the first medium-to-large scale multiprocessor from Honeywell. It consists of shared data files and two CPUs, each with its own memory. Combined memories can be 512K to 1M characters. Cycle time is 750 nsec.

A typical disk and tape configuration can lease for $42,712/mo or sell for $1,553,160. Deliveries will begin in April.

The Model 2070 is a medium-to-large scale computer with 50% more power than the 4200. Memory sizes available are 128K to 512K characters. Cycle time is 1 μsec/4 char.

A typical tape and disk system rents for $25,196/mo or can be purchased for $883,840. First deliveries will take place in May.

With a cycle time of 1.14 μsec/2 char., the 2060 offers better performance than the current Series 200 Model 2015. It is available with memories of 128K to 512K characters.

A typical tape-disk system sells for $680,880 and leases for $18,724/mo. Shipments will start in April.

The 2050 processor has memories from 96K to 256K characters. Cycle time is 1.6 μsec/2 char., twice as fast as the Series 200 Model 1015. A typical tape and disk system leases for $13,494/mo and sells for $494,260. First deliveries will be in April.

The 2040 offers performance equal to the 1015 at lower cost. Cycle time is 1.6

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Enact Data Bank Laws, Sen. Ervin Tells Congress

By M. Upton
Of the CW Staff

WASHINGTON, D.C. – "Congress . . . has an urgent duty to enact laws to control the rapid development of large interlinking computer data systems in the Federal Government which may affect the rights of citizens who deal with government," according to Sen. Sam J. Ervin Jr. (D-N.C.), chairman of the Constitutional Rights Subcommittee.

In announcing the publication of the first volume of testimony taken by the subcommittee last year during its hearings on federal data banks, Ervin noted: "These hearings have treated some computer problems in depth, but could only brush the surface of some highly technical, complicated subjects.

"Taken altogether, I believe the hearing record shows the need for new federal laws to correct specific abuses. It also shows the need for intense legislative and public study and thought about where our society is headed in this computer age and about how the powers of government over this vital area shall be exercised in the years ahead to the end that freedom shall be preserved," he observed.

The Issues

During the hearings, which "examined some of the monumental constitutional, legal and practical issues confronting . . . society as it moves into the computer age," the subcommittee heard testimony from individuals who were under government surveillance as well as officials in-

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Multi-Modular Memory Used In Univac 1106 II

By a CW Staff Writer

BLUE BELL, Pa. – Univac has produced a faster version of its 1106 computers, the 1106 II, by substituting a faster "Multi-Modular Memory" for the memories currently in use.

The new memory similar to the 1.5 μsec modular memory, announced with the 1106 in 1969, but with a cycle time of 1 μsec, allows instruction access to be overlapped with data accesses. The cost of the new memory will be about $1,000/65K word module more than the older memory, Univac said.

Most Univac 1106 users, however, use Unitized memory which costs about half as much as the modular storage but allows no overlapping. The new memory, with a cycle time 50% faster and an overlap capability, promises effective times up to 300% faster for a little more than twice the memory cost.

Currently installed 1106s can have the new memory installed in their systems as a field change, Univac said.

Currently installed Univac 1106s with two or more 128K blocks of Unitized Memory can now be modified in the field to allow the systems to overlap access times between memory banks, Univac said. This would mean an effective speed increase of up to 100%, according to Univac.

Picking a Jury

Judge William Fillmore Wood of Elizabeth, N.J., says he "wouldn't believe what the computer does, if I didn't see it with my own eyes," in referring to the Univac 9400 that he uses to select juries. Before, he said, he had to sit all day while names of jurors were almost literally "pulled from a hat." He just presses two buttons – any two-digit number – and the computer randomly selects jurors from that point.

Boston First Stop

Forum Has Local Appeal

By a CW Staff Writer

BOSTON – "I think I have a good solution to the data entry problem, and I'd like to share it with other users," said Bob Chernis, DP director at Lumber Mutual Fire Insurance Co., in nearby Cambridge.

"I'd also like to see other users' solutions, evaluate them, and keep reevaluating my own solution," he added, in explaining why he accepted an invitation to be a panelist and to lead a workshop at the first Computer Users' Forum and Exposition next month.

Data entry is one of the three topics to be discussed during the three-day meetings, which begin here Feb. 22. The other topics are data communications and operational efficiency, with one day devoted to each subject.

Intelligent Terminals

Chernis is a user of intelligent terminals, which he described as "more than just keypunch replacement, but not quite on-line." He said intelligent terminals provide many of the advantages of on-line systems, without the additional expenditures for core. "We edit and verify with

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On the Inside

Troubles With Wales Laid to Mismanagement

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. – The major problems with the Washington Area Law Enforcement System (Wales) were caused by poor management, not faulty software [CW, Jan. 12], according to one of the members of the original design team.

"The implementation and continual maintenance of a real-time system, such as Wales, make much heavier demands upon management, in contrast to the more standard batch computer systems," according to George W. Woolley, a programmer for the original team and now with the D.C. Government's Executive Office.

"Management's responsibility to see that well-trained computer technicians are available for the continuous maintenance and monitoring on an operational real-time system was not met and has been the source of the problems that have plagued Wales," he said.

"Correspondence from the original Wales contractor to the D.C. police department, dated April of 1969, stressed the need for extensive training of police programmers who were to eventually be responsible for Wales. During the period of the contractual relationship, this training need was discussed repeatedly; yet, the police department would not recognize this need," he charged.

Woolley also denies that the original contractor tried to do too much too fast by developing a complete system instead of by modules.

"Wales was, in fact, developed in a 'modular' manner. Existing IBM Type III software (Faster) was used for the real-time monitor, and each real-time function, such as separate inquiry programs, was developed as an independent module. The initial implementation of Wales consisted only of the inquiry modules, with the on-line updating and data collection programs scheduled for subsequent phased implementation," he said.

The major problem found with the Wales system in operation was the lack of an on-line update program with which the outlying police departments tied into the system could enter information. But Woolley charges that the package had been developed, just not put into operation.

"When the contracts between the original Wales contractor and the police department expired," he said, "on-line update programs had been developed and tested in the real-time environment. However, the contractor recommended that the update programs not be implemented immediately.

"The contractor reasoned that the implementation of on-line updating should be delayed until the Wales users (active duty policemen who would not be full-time terminal operators) should first become thoroughly accustomed to using the system.

"It was also felt that update implementation should await the expansion of the operating schedule from an eight-hour day to a 24-hour day and the existence of an adequately trained staff to monitor the system.

"It was not anticipated that the on-line update programs would lie dormant in a card cabinet for over three years," he added.

During this same period, specifications for real-time modules that would accept "warrant" data from the terminals, for subsequent batch updating, were developed by the contractor, Woolley said.

"Police department personnel then were to develop these programs. If this facility had been implemented, there would be no need to carry punched cards to the computer site," he added.

Tax Conversion in Calif. Tests Firms' DP Resources

By Marvin Smalheiser
CW Correspondent

LOS ANGELES – The agonizing by California employees over state payroll withholding tax deductions, which began Jan. 1, has been matched by the anguish of some of their employers, who struggled dutifully but vainly to realign their payroll systems in time.

Even many of those who did meet the deadline experienced three to four weeks of hectic programming because the withholding tax law was signed by Gov. Ronald Reagan on Dec. 8. Also, the conversion was complicated by new federal tax changes and issuance of federal W-2 tax information forms.

There were reports of firms throughout the state who were given 30- to 90-day extensions because of problems ranging from tie-ups in programming to installation of new computer equipment.

Those with accounting machines were said to be most affected and there were reports that firms with National Cash Register equipment were unable to make changes in programs and equipment. Dozens of NCR's clients were said to have applied for extensions and waivers until March 31.

Richard W. O'Neill, Los Angeles branch manager, said the problem was not with NCR but with accounting machines in general since the majority of accounting machines did not have a column available on their equipment to take out the withholding.

To correct the situation, it was necessary for businesses to get the proper stationery and reprogram their machines. He said 98% of accounting machines are preprogrammed and the programming revision involves putting an extra print position on the machine.

James E. McNeil, administrator of the Tax Collections Branch of the state Department of Human Resources Development (HRD), which is supervising the collections, said: "The problems were much smaller than we anticipated."

Some companies, he said, had expected five to six months would be needed to change over but "we received very few requests for extensions."

Most large companies had the computer power to do the job and anticipated the approval of the withholding tax law, a political football for many years.

A spokesman for Douglas Aircraft Co., Long Beach, a division of McDonnell Douglas Corp., said the conversion was made within a week and it was prepared to run its first payroll Jan. 7. Its only problem was the late arrival of the table specifying the percent to be withheld.

Torrance, a Los Angeles suburb with a population of 137,000, was granted a 90-day extension but expected to be on-line after 30-days.

Gary Sharp, DP manager, said the city was just converting from an IBM 360/20 to a Honeywell 115 when the law was signed.

Los Angeles County got 71,000 checks out for its employees on time and a spokesman said "it went fairly smoothly." Like many California employers, it already had a box on its check stubs for state withholding.

Takugi Tamaru, general manager of the Los Angeles City service bureau, said the tax had been anticipated and a module in the payroll program set up in advance.

The city, which has 30,000 employees, had set up a new payroll system in July which was designed for the possibility of withholding.

"The biggest problem was the short time because of the late signing of the bill," Tamaru said. The adjustment took the city a couple of weeks.

The change was a bonus for Pay-Fone Systems Inc., Los Angeles, which specializes in preparing payroll checks. It got 68 new customers in December and Lewis Greenwood, president, said 20 to 25 were companies which preferred to let someone else solve the problem.

The Bank of America's payroll service department in San Francisco, which handles about 5,000 payrolls for customer firms in California and elsewhere, said it had no difficulty.

5-Phase System Aims to Slash Hospital Costs

Special to Computerworld

LOS ANGELES – A hospital information system, with the promise of producing dramatic savings for the nation's hospitals, was introduced here last week by Health Datanet (HD), which plans a nationwide medical information network by 1976.

The first phase of the system, called Health Oriented Programmed Environment (Hope), is being installed at the City of Hope Hospital, Duarte, a Los Angeles suburb, and will be implemented by March. HD is ready to deliver the first phase nationally, the company said. The second phase, which will involve patient care, may be implemented by the end of this year.

Robert M. Sloane, administrator of the City of Hope medical center, said he anticipated savings of $50,000 the first year, but added the hospital's primary interest was to help develop the system's potential for reducing costs for large and small hospitals.

Health Datanet, based in Duarte, is sponsored by City of Hope, a 212-bed free hospital specializing in catastrophic illnesses such as cancer and leukemia, and University Computing Corp. (UCC), Dallas, Texas.

It is a not-for-profit corporation that was formed recently as a marketing and development company.

James R. Jones, president of HD and former Western Region Manager for UCC's Data Link Division, said the nation's annual hospital bill could be cut by at least $1 billion within the first 30 months after completely computerizing its hospitals.

"What we're offering in Hope," Jones said, "is the application by hospitals of computer services already tried and tested in the oil, aerospace, banking, utility, retail merchandising and many other industries."

The five phases of Hope are: patient accounting applications; patient care needs; hospital procedure applications; area-wide medical information systems; and a nationwide medical information network.

5 HIS CPUs Complement 200 Line

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μsec/2 char. Memory is available in 48K to 128K characters.

A typical disk system has a lease price of $6,988 or can be purchased for $220,135. First deliveries will be in April.

The Datanet 2000 communications-oriented front-end processor can handle from eight to 120 communications lines and can be used with current Series 200 as well as 2000 models.

It is made up of a new 24K to 64K 16-bit mini with a 770 nsec cycle time, computer interface, network interface for communications lines, teletypewriter and real-time clock.

Line speeds from 45.5 to 10,800 bit/sec can be handled. Transmission can be full or half-duplex. Messages can be synchronous or asynchronous.

The price of the basic system is $1,033/mo or $36,108. First deliveries are scheduled for the third quarter of 1972.

The Visual Information Control Console (VICC) is standard on models 2070 and 2088 and optional on the rest of the 2000 line. It can be added to any medium-scale 200 system.

The console combines a standard keyboard, 12 in. CRT screen and control panel.

A second CRT, printer, 23 in. remote CRT and a display switch are options. In dual-display consoles, one CRT is used for interactive messages from the operator while the other is used for specially formatted displays. The lease price of the VICC is $986/mo; purchase price is $37,600. First shipments will be in July.

The 275 disk pack drive subsystem is available only with Series 2000 processors. Capacity can range from 36.8M to 147.2M characters.

The minimum configuration of two drives and control unit can be expanded by adding up to six additional drives. Average seek time is 57 msec, latency time is 12.5 msec and data transfer rate is 208,333 char./sec.

The minimum system can be leased for $1,320/mo, with each additional drive, $440/mo. Purchase price is $48,000 for the two-drive system and $16,000 for each added drive. Deliveries will begin in April.

OS/2000 Software

Users of the new HIS OS/2000 have more communications and much stronger multiprogramming capabilities than previously available for the Series 200 CPUs, and they can use current applications with little or no reprogramming. OS/2000 can be used on medium and larger models of the Series 200.

In multiprogramming mode, OS/2000 supports 15 independent operations simultaneously. Up to 10 application programs may reside in dynamically assigned partitions of main memory, along with five "data transcription" utility operations. under the new operating system.

OS/200, an earlier operating system, could control only one communications and two batch operations in addition to five data transcriptions, in fixed partitions, an HIS spokesman said.

User and system jobs, and the data transcription routines, share a Multiple Variable Partition (MVP) area of memory, under OS/2000. The size and number of functioning partitions within MVP is changed dynamically by the system to obtain maximum amounts of contiguous core.

The system has been extended to interface with the Datanet 2000 data communications processor or the Type 286 multiline communications controller.

A data base management module has been added to OS/2000.

The Mod 4 operating system has been enhanced primarily to include efficient management of the dual-processor Model 2088.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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EDITORIAL OFFICES: 797 Washington St., Newton, Mass. 02160 (617-332-5606; TWX 710-335-6635). **Europe:** Computerworld, c/o IDC Europa Ltd., 59 Grays Inn Rd., London, W.C.1, England (01-242-8908).

Second-class postage paid at Chicago, Ill. Published weekly (except: a single combined issue for the last week in December and first week in January) by Computerworld, Inc., 25 E. Chestnut St., Chicago, Ill. 60611.

25 cents a copy; $9 a year in U.S.; $10 a year in Canada; Airmail to Western Europe and Japan, $15 a year. Other foreign rates on request. **MARGARET PHELAN,** *circulation manager.* Four weeks' notice required for change of address. Address all subscription correspondence to circulation manager, Computerworld, 797 Washington St., Newton, Mass. 02160.

W. WALTER BOYD, *publication manager.* **PATRICK J. McGOVERN,** *publisher.*

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POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, Mass. 02160.

Ervin Tells Congress To Enact Data Laws

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volved in gathering information.

In addition, legal and academic experts testified on the state of U.S. privacy laws, asserting laws and administrative rules need updating to keep pace with developments in data processing and their use by political and governmental organizations.

Ervin asked Congress to "enact laws to prevent future abuse of the Army's power to investigate law-abiding civilians" and called the volume "an incriminating record of inequities in the Executive Branch of the Federal Government which have threatened the privacy and First Amendment rights of all Americans."

Copies of the 1,000-page record of testimony taken by the subcommittee during the privacy hearings are available for $4.50 from the Superintendent of Documents, U.S. Government Printing Office, 20402.

News Wrapup

Inmates' Behavior Predicted by DP

WASHINGTON, D.C. – The D.C. Department of Corrections will soon begin using a computerized system to optimize its methods for choosing men for its community correctional centers (halfway houses).

The system is designed to predict outcome, or calculate the odds for or against success, for men placed in one of the department's community centers.

The system was developed for the department under a grant funded by the Law Enforcement Assistance Administration and the Institute for Law Enforcement and Criminal Justice.

The computer program, Inform 9, is an improvement in the forecasting art, according to Dr. Stuart N. Adams, research director for the department.

For the department's scoring device, all necessary information (such as length of sentence, whether in maximum security, kind of offense, education, work and family history) about 879 men who had gone through the department's work-release program was fed into a computer to develop a scoring scale that would give odds for or against success.

Officials Have Plans to Halt Cargo Thefts

HOUSTON – Computer printouts in the next few months should give customs officials an idea of where theft is concentrated at the Port of Houston and what kind of products are most often pilfered.

"After we identify the creature, maybe we can catch it. It might have one head, it might have six," said Ernest J. Gonsoulin, chief architect of a computer program to determine the scope of the problem. The computer program is being installed throughout the country by the U.S. Bureau of Customs.

L.A. May Data Bank Welfare Recipients

LOS ANGELES – The Los Angeles County welfare watchdog commission has endorsed a proposed $216,000 study that may establish a computerized master file of some 870,000 welfare recipients.

The Commission to Review Public Social Services voted to endorse a management consultant contract with System Development Corp. of Santa Monica. If the board of supervisors approves the plan, a seven-month study of the use of computers to help keep track of welfare recipients will begin.

Mass. Welfare Plan Includes Backup

BOSTON – Overall welfare reform, particularly in the computer center, is the recommendation of the internal report circulating at the Massachusetts State House [CW, Jan. 19].

Prepared by the Project Management Office of the Department of Public Welfare, the "financial management control system" to be developed would provide a payment control system to check eligibility and amount of grant; this would also entail computing and writing the check, and keeping appropriate records.

The system would also include account balancing and other MIS functions, a master file of recipient's records and centralized backup facilities.

Skiers With Foresight Get an Extra 'Lift'

BOSTON – With the subscription of several ski resorts to Ticketron, skiers can now buy lift tickets in advance and avoid rushing to the slopes the next day or the next weekend.

Big Bromley and Stratton Mountain in Vermont and Loon Mountain in New Hampshire began the new system during the holiday season. Local retail stores and banks tied into Ticketron terminals will provide the extra "lift."

Phone Companies Make Friends

Customers Pleased With California Data Services

By Dennis Goss
CW Correspondent

For the computer user unhappy with the data communications services provided by his local telephone company, a suggestion.

Try California.

A recent CW survey of data communications users in the Golden State revealed that both service and facilities were more than satisfactory. Even those with specific complaints admitted that overall they were happy, and several of those contacted dealt not with one telephone company but two – Pacific Telephone and Telegraph and General Telephone of California.

Of the two companies, Pacific got the higher grades, eliciting such comments as "attentive to needs, very qualified service people, very cooperative and performance is excellent." A spokesman for a time-sharing service in Cupertino suggested that some past criticism might not have been justified.

A San Diego area user described his problems with an out-of-date switchboard and explained how, when explained to Pacific, his six data communications lines were rerouted through an ESS station. "Our problem was solved, and they apologized for the inconvenience," he said.

Not as Good

The consensus on General Telephone's service in the data communications area was that it was not as good. Users of both services said that General Telephone people had less experience and, thus were less agreeable and exhibited less confidence. A time-sharing utility spokesman pointed out that his firm does not put district offices in areas serviced by General Telephone, but admitted that any problems could probably be worked out if it did.

An Oakland area user with facilities throughout the state attributed problems with General Telephone to the fact that the company was newer in data communications. On the other hand, a Lathrop customer said that it has had no problems with General Telephone.

The head of communications for a large San Francisco user attributed his firm's good service to knowing how to get along with the telephone company. "You have to know how to politick, make the right contacts, and encourage your corporate officials to develop relationships with theirs."

Favor Leased Lines

There was general agreement that leased lines were better than dial up and that much of the service provided was expensive. But, leased lines were not always better. One customer told of getting country and western music, aircraft radio transmission, and a dial tone over leased lines. A Bakersfield manufacturer reported such good service with dial up lines that it has never had to call for service. Another user told of transmitting at 4,800 Baud over dial up lines with better success than over leased lines.

In discussing costs, a San Diego user expressed dissatisfaction over a $150 charge for a two-hour data set installation. A Redondo Beach user, commenting on the cost of doing business with the telephone company, pointed out that equipment was probably expensive due to the workmanship that went into it. "They build things like a Mack truck," he said. "Their 103 modem looks like a briefcase. A similar device could be put on one circuit card using LSI. But, in a few months, something might go wrong with the circuit card. Trouble-free service can be expected from the 103."

A Los Angeles time-sharing service states it was using modems from an independent manufacturer and those supplied by the Bell System. "We get the feeling we should switch to Bell," a representative said.

Own Needs

To what do users attribute the quality of service they receive? Several said the ability to understand their own data communications needs before going to the telephone company. Several users explained that what their firms were doing in communications was very advanced, but they got the cooperation they needed by sitting down with engineering, plant and marketing people and discussing the situation. Another said that the time spent by its staff in developing expertise in this area has been invaluable, while still another stated that, when problems occur, a user should be prepared to prove to the telephone company that the problem is the company's.

Trained Personnel

Still, though, telephone company employees are praised. "It's the people trained at Cooperstown," one communications manager said, referring to the advanced data communications training center run at Cooperstown, N.Y., by American Telephone and Telegraph until discontinued in mid-1971. Those attending this center received a three-month course in all aspects of data communications.

The communications manager said center graduates knew what the user was talking about. "Perhaps more important, they know what they do not know and produce the right person with whom to discuss data communications needs."

Are there any special practices Pacific Telephone and Telegraph and General Telephone employ that enable them to offer such acceptable service?

Leonard Dorn, data and special services administrator at General Telephone headquarters in Santa Monica, said that his company makes a sharp division between voice and data services. "Those involved in data communications are a special group, with separate engineering, marketing and plant departments," he explained, adding that people in this area never get involved in the voice area. He said that these people receive formal training, and the combination has produced a high degree of dedication.

A spokesman for Pacific would say only that customer satisfaction is a result of efforts to provide good service for all customers but did mention that there were a variety of training programs open to employees, some lasting as long as 20 weeks.

Local User Participation Big Conference Attraction

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the source document," he noted.

Chernis's statement "neatly sums up" why *Computerworld* chose the unusual format for its traveling conference and show, according to Robert M. Patterson, CW executive editor and forum director.

"Everyone knows that nationally prominent experts have a great deal of valuable information to offer users," Patterson said, "so we will have three such keynote speakers touring with the forum.

"But, as a user-oriented publication, we also know that users have a great deal of practical experience to share with each other, especially if they come from the same area."

Therefore, each of the nine forums will be regionalized to the extent that the panel discussions and workshops will be conducted by users from that area, he said.

"Our aim is to provide the most worthwhile feature of both national and local conferences," he said. "The national speakers and the exposition, called the Computer Caravan, will travel from city to city, but the majority of the forum participants will be local people."

The tour starts in Boston Feb. 22, and is followed, in order, by New York, Washington, D.C., Atlanta, Dallas, Los Angeles, San Francisco, Chicago and Detroit.

Hardware, Software Answers

The conferences will enable users to discuss hardware and software problems and solutions, successes and failures from both a national and regional standpoint.

Panel discussions and workshops will feature 12 users from a variety of companies and organizations in each area.

Registration has already begun for the first few cities, according to H.G. Asmus, general manager. Fees for the full forum are $25 for one day, $45 for two days and $60 for all three days; the prices include all conference materials and a luncheon on each day, plus admission to the exhibit hall.

"Users who register in advance will be able to avoid long registration lines," he said, "because their badges and working materials will be waiting for them when they arrive."

Exhibit-only admission will be $5, Asmus said. The latest in data entry, communications, peripheral equipment and software will be on display, and users will have an opportunity to talk to company representatives from the local area, he said.

National Speakers

Each day will start with a keynote address by a national speaker. Opening day, Lawrence Feidelman, editor of *Data Entry Today* and president of Management Information Corp., Cherry Hill, N.J., will discuss data entry.

The second day, Dr. Dixon Doll, consultant and Eastern Michigan University educator, will discuss data communications.

The third day, Charles P. Lecht, president and founder of Advanced Computer Techniques, New York, will discuss operational efficiency.

The speakers will give an overview of the equipment and management principles currently in use or expected in the near future, according to Edward J. Bride, CW staff writer and forum coordinator. Bride edits CW's DP Societies and User Groups Section.

A "practical, rather than strictly theoretical approach" will be taken on each topic, he said.

"The goal of both the keynote presentations and the discussions is to help users solve their application problems and improve the cost effectiveness of their individual computer operations," he added.

User Panel

After the keynote speech, a user panel will outline specific, first-hand experiences with various types of equipment and why they were chosen. Hardware, software and managerial considerations will be discussed, including local service, reliability and delivery considerations.

The discussions will avoid brand name comparisons, Bride added, and center around which "types of equipment" are best for specific applications.

After the panel discussions, each panelist will conduct a separate workshop. The four data entry workshops, for example, will be conducted by a user of key-to-disk or similar equipment, an OCR user, a user of intelligent terminals, and a user with direct data entry equipment.

Local user participation is one of the strongest attractions for this conference, Lecht commented. "This is a user-sponsored, not a manufacturer-run show," he added.

Several DP societies and user groups will be taking advantage of an offer of meeting rooms and table space in the lobby for membership publications, Bride said.

Groups contacted and indicating plans to participate, in at least some of the cities, include DPMA, ACM, the IEEE Computer Society, ASM, the Society of CDPs and the Association of Computer Programmers and Analysts. All headquarters offices of these societies have been informed of the available facilities.

Survey Looks at Maintenance

Honeywell Seems to Be Satisfying Former GE Users

By Frank Piasta
Of the CW Staff

NEWTONVILLE, Mass. – Most former GE customers are as satisfied under Honeywell as they were under GE in respect to software and hardware maintenance, according to a recent CW survey.

All in all, the transition was relatively painless for most installations, with the same GE personnel usually assigned to solve their problems.

In contrast to the hardware maintenance picture, which generally rates high marks, the handling of software systems bugs was said to need improvement.

Loyal Still

User loyalty has not diminished since the merger, the survey also found, with most users willing to consider Honeywell equipment when the time comes to upgrade their installations.

The software bug handling procedure was called "terrible" by at least one user. He said that calls to Phoenix to check on the knowledge of a software problem frequently resulted in an answer of "it can't happen." This was always followed by the transmission to the Arizona location of necessary documentation and by telephone discussions of the problems. Eventually, the bug would be fixed, he said.

Former GE Employees

The user attributed the problem to the fact that most of the personnel doing maintenance were formerly with GE, and results then were no better, he said. He expressed faith in Honeywell's own software staff and said he would be happier if it were handling the former GE products as well.

A second user added it had become much harder to get in touch with Phoenix than previously. GE used to allow almost any number of calls between the user and the support staff, while Honeywell seems to be exercising much tighter control, he said.

Happy Users

The happiest users seemed to be those who used their systems for time-sharing. These customers, who typically write most of their systems programs, spoke of excellent hardware dependability with mean time between failures of 100 hours and up. Overall uptime was said to be typically 99%.

All the time-sharers were not joyous, however, One felt that the company's contract proposal in regard to time-sharing computers could stand reworking. He pointed out that in his environment peripheral usage in many cases was disproportionately small compared to CPU time. Consequently, he said, he was paying a very high price for peripheral maintenance on equipment that didn't come close to the number of hours that minimum maintenance charges are based on.

The only hardware complaint was voiced by users who said that their installations occasionally had to wait an inordinately long time for the delivery of a spare part. None of these waits, they admitted, was for a part of a critical nature, and had caused no serious problems to the site.

The users almost unanimously were satisfied with their new Honeywell salesmen. After the expected period of adjustment, a period that required some degree of handholding on the part of some users, the salesmen proved to be very hard working and cooperative, the users said. Several said no great pressure was being applied to change their installations to the Honeywell Series 200.

Delinquent Dads Get Caught

PORTLAND, Ore. – A Univac 418 is helping county officials here collect child support payments by preparing bills, sending out overdue payment notices, and most recently, citing delinquent fathers into court.

Eventually the real-time computer will be able to prepare arrest warrants at the order of a judge. It is estimated the county will collect $9 million in child support payments this year.

Orbiting satellite relays signals.

Special Report

Communications, Part III

Satellites: the Answer To the Data Line Crush?

This month's special report on the new specialized common carriers gives users an overview of what is available and what can be expected from the new data services.

Part I considered how the specialized carrier evolved, what MCI service means to the firm's first users and the potential data uses of cable TV systems in urban areas.

Part II looked at the great expectations of the potential carriers and the probable reaction of AT&T.

By Ronald A. Frank
Of the CW Staff

Earth satellites appear to offer great potential for data communication users. And the FCC is currently considering eight applications to establish and operate domestic satellite systems.

Satellites over the U.S. could greatly increase the channel capacity and relieve the strain on present telephone facilities without requiring the long lead times associated with land-based systems. In addition, computer data transmission tests on satellites have shown that these systems can be much more reliable than landlines with lower error rates.

Most important, present communication rates are based on distance. The further a user transmits his data, the more it costs. With satellites distance is transparent. A block of data can travel 1,000 or 10,000 miles via a satellite system and regardless of distance only two earth stations and the satellite handle the transmission.

Comsat System

At present a worldwide non-domestic satellite system is operated by Comsat. The "carrier's carrier," as it has been called, is responsible for the operation of 51 earth stations in 38 countries with 60 antennas that monitor and relay the transmission of a network of Intelsat satellites or "birds."

U.S. installations can presently use available satellite channels supplied to them through international carriers such as RCA Global Communications, Western Union International and ITT World Communications. But domestic portions of a user's data network now must utilize more conventional telephone company facilities.

This could change radically when, as expected, the FCC decides on who will rule the U.S. satellite airways. The White House, through its Office of Telecommunications Policy (OTP), has recommended a policy of open entry into the domestic satellite arena, but it may not be possible for all the entrants to physically cram their birds into the available space in the wild blue yonder.

Satellites have to be precisely positioned into "synchronized orbits" at 22,300 statute miles above the Earth. In addition, the birds cannot be parked too close to one another or interference will result.

But an FCC staff spokesman sees little cause for concern. There is probably enough room for all present satellite applicants to operate domestic systems, although some of these would be limited to specific geographic areas, the spokesman said. For example, some systems would perhaps have to restrict themselves to the Continental U.S. without providing service to Hawaii and Alaska.

Spring Decision?

But the FCC is currently wrestling with a satellite policy decision that is expected "by spring of this year," according to one staff member. Besides the technical problems, which are being studied for the commission by the National Aeronautics and Space Administration (Nasa), some tricky regulatory issues have to be worked out.

While it may be technically feasible for all applicants to set up their own satellite systems, it is a massive economic undertaking. Some economists feel there is not yet sufficient demand for multiple domestic satellite networks. Approval of two or three systems would fill the demand for the next 10 years, they say.

A list of satellite applicants may look like the specialized common carrier story reborn, to users. MCI has teamed up with Lockheed to propose a two-bird 48-channel system with 20 earth stations that would cost $169 million. The second bird would basically be used as a spare except for 20-minute periods in a 10-day span during spring and fall.

At these intervals, the satellite would be positioned directly between the earth and the sun. When this happens the radio energy emitted by the sun makes the bird inoperative for short periods, thereby necessitating the back-up.

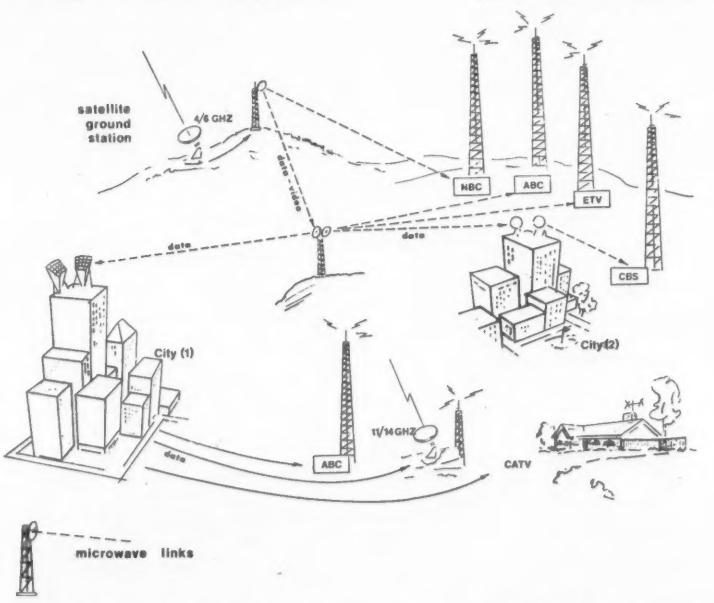
Another specialized carrier applicant that has bid for a satellite system is Western Telecommunications Inc. It has proposed a two-satellite system with 12-channel capability costing $67 million, with six ground stations. As might be expected, AT&T, (with Comsat), Western Union and RCA among existing carriers have filed plans for satellite systems.

'Old Hat'

Although it is being described as a new transmission technology, satellites are already "old hat" for military and governmental agencies. While many of these systems remain classified their technologies are spilling over into commercial applications.

With digital transmissions, one problem that must be overcome is the delay in sending a signal to a satellite and back down to earth. One engineer described the formula for calculating the delay as

(Continued on Page 9)



Earth stations would transmit computer and TV information from city to city, via satellite.

Banking, Retailing Growth Areas

It is not difficult to find glowing projections for the growth of data communications in the seventies. But data communications is a general term that really doesn't define specific areas in which users can expect to be approached by suppliers of new services.

In a study for Datran by Booz Allen & Hamilton, it was found that the transaction-oriented users will be those with largest increased demand for data services. The biggest increases were predicted for data users in retailing, banking and finance, information services and health care.

In retailing, the study predicted that point-of-sale terminals will be reporting to CPUs in new data networks together with credit authorization and inventory control applications.

Banking, Finance

In the banking and finance area, the study said on-line teller inquiry systems that allow instant readouts of customer account balances and other information will become increasingly important. Voice response systems are expected to play a large role in these types of data systems.

In the health care area, the Booz Allen study predicted growth in patient accounting and monitoring systems, medical record keeping for physicians groups, and accounting data networks for medical insurance companies.

The study surveyed users about their present problems with existing data services. High on the list was a "lack of carrier responsiveness" and an "insensitivity to customer needs."

Second were maintenance problems and later-than-promised installations. Another problem area cited by users was the quality of service with high downtimes and "inconsistent transmission quality."

Excess Facilities

The study also sought to determine how data users compensated to overcome these problem areas. Most installed excess facilities as a buffer against trouble. And many users operated their data sets at slower than rated speeds. The study found that more than 85% of dial-up data sets were operating at 30% or less than the rated channel capacity.

(Continued on Page 9)

If Bell Decides to Compete, Tailored Rate Services May Follow

Expected changes in future telephone charges will probably include a shift to pay-as-you-use rates. The Bell System has made several attempts to single out specific classes of users to initiate selected higher rates. In Ohio, Illinois and some other areas, phone companies have proposed an Information System Access Line (Isal) rate.

These proposals would have charged more for the use of lines terminating in computers primarily because Bell believed that such circuits were used much more heavily than other "normal" types of lines.

For data users it is significant that in most hearings on the Isal-type plans it was not possible to prove that data users put a bigger drain on facilities.

But measured rates might well prove to be an advantage to data users. Some time-share vendors (who originally were accused as "unusual users" by Bell) now say that improvements in terminal entry methods and CPU processing speeds have actually reduced their holding times on telephone lines even though their volume of subscribers has increased.

These sources also point out that CPU-to-CPU transfer of data over telephone lines, an area expected to grow in importance, can move more infomation in a given time period than almost any other method. In such cases the data user would be getting more for his phone throughput dollar than other users.

So far it has been difficult for Bell to collect data to show who are its heaviest users. But a new Continual Surveillance Data System for phone tariff is being installed by Pacific Northwest Bell to study where the heavy usage (if any) comes from.

In addition, Bell is already charging more for operator-assisted calls than it does for directly dialed ones. And AT&T officials have said they are considering plans to charge separately for other services that require human intervention, such as directory assistance calls.

If Bell decides to compete directly with MCI and the specialized carriers, new services with tailored rates such as MCI's half-time and one-way offerings may be part of tomorrow's telephone bill.

Satellites May Ease Data Line Strain

(Continued from Page 8)

finding the distance, dividing by the speed of light and coming out with a time relationship.

On a more down-to-earth approach, most data sets are equipped to cope with transmitting delays of wires and more conventional phone systems. On a transcontinental data call at a distance of 3,000 miles, this "propagation delay" is about 1 to 2 nsec. But the round-trip delay up and back from a satellite can be as much as 250 nsec.

This longer delay is important for data sets that use confirmation error correcting codes. These modems send their data back to the sending terminal for confirmation before handling the next block of data. Conventional data sets have a delay of about four or five seconds which is plenty of time for the transcontinental delay and answer back. If these modems don't hear the answer back, they automatically retransmit their data and assume that the message has not been received.

Modification

With satellites, this built-in delay must be increased to allow for the longer propagation time up to the bird and back. "But this is not an insurmountable problem," according to one satellite engineer, "and hardware modifications can easily compensate for this problem."

While some refer to satellites as "nothing but a very tall telephone pole with a repeater on it," there are some unusual advantages to the birds that will greatly benefit tomorrow's data user.

Most of the "bread and butter revenue" from the new systems (assuming FCC approval) will come from television transmissions. And these networks operate only from early morning to midnight. This leaves the off-shift hours free for computer transmission. With no TV programs the bandwidth available to early a.m. computer users becomes impressive.

"There would be a zillion gigahertz of channels available when the broadcasters were shut down," according to one spokesman. "This would be enough to tie all the CPUs in the country together for one large gabfest."

To put these facts more into perspective, one TV program requires about 35 to 40 mHz when transmitted via satellites. But the same satellite channel could handle up to 1,000 data transmissions during these non-TV times.

30-Foot Antennas

Larger capacities can be handled by present international systems utilizing earth stations with 100-foot antennas. But domestic system economies dictate 30-foot antennas as a viable figure, according to a spokesman for Cosmos Engineers, Inc., a firm which specializes in satellite system design.

The proposed domestic systems will probably have about 30% to 50% of their capacity dedicated to computer data use. Approximately two years after initial FCC approval a satellite system can be ready to begin service to its first subscribers.

The implementation of a satellite system is still a massive undertaking that requires close coordination among several agencies. An applicant with FCC go-ahead will not be able to launch a satellite from a makeshift pad next to his plant. All U.S. launches for domestic systems will be the responsibility of Nasa. A propulsion company will make the rocket vehicle to propel the bird into a parking orbit. And the applicant will be responsible for constructing the satellite.

The initial parking orbit is much like leaving a package on the loading dock. The operators of the satellite will "take delivery" of the airborne bird in the parking orbit and then boost it into its permanent synchronous orbit where it will operate with an expected life of about 10 years.

In addition to operating the satellite while it rides fixed in space, the successful applicants will build and operate earth stations to relay transmissions between conventional land lines and the bird.

Interconnection

There is also a possibility that satellite systems will interconnect directly with the specialized carrier systems. William G. McGowan, chairman of MCI Communications Corp., recently predicted that downtown small disk-shaped earth stations would interface domestic satellite systems with the specialized carrier networks.

Some communications seers see a merging of the promising new technologies at some point in the not too distant future. They predict that data signals will be interchanged freely from specialized carriers through cable TV systems over satellites and via existing telephone company facilities such as the switched network.

While such ties are probably possible from a technological standpoint, most observers agree that many economic, regulatory and political obstacles will have to be overcome before an interconnected universal communications net can exist.

Meanwhile data users can savor the prospect of existing and new carriers competing to serve their needs with an ever increasing variety of new custom-tailored offerings.

Retailing, Banking Growth Predicted

(Continued from Page 8)

Some users also installed costly error detection and error correction equipment to overcome their problems.

Longer range predictions on communications were made recently by The Institute for the Future which considered the type of services that will be available by 1985.

The study predicts that about three million Picturephone sets will be in service with 66% of these used "mostly for data and information services." At least eight specialized dedicated data communication networks will be in operation serving 235,000 terminals, according to the report. Most of these systems will use "some facilities of the public switched [telephone] network," the study says.

Carrier Growth

By 1985 between five and 30 new interstate carriers will have been authorized with perhaps four separate domestic satellite systems in service, the Institute predicts.

In addition, a change in the regulatory climate, favoring competition, will evolve, the report says.

A profile of tomorrow's data user was given recently by an officer of one of the specialized carrier applicants who said that the - "sophisticated data communicator will be using AT&T's switched network for voice and data in addition to some dedicated point-to-point circuits that may be acquired from AT&T, Western Union, or one of the specialized common carriers."

Editorial

Stacking the Deck

The Bell System, with the acquiescence of the Federal Communications Commission, has put an artificially high floor under prices for data communications equipment.

It works like this: If you get equipment from the telephone company, the installers hook it directly into the network. But if you buy a Widget-2 from an independent, you are required to hook it into the network through a protective interface called a Data Access Arrangement (DAA). You can only get DAAs from the telephone company – and you must pay for them.

So, despite the Carterfone decision, it's not an open market. The economies for the user are as follows: Either get your equipment from the telephone company for X dollars or from an independent for Y dollars plus Z dollars for the DAA. The telephone company can't lose and the independent and the user can't win.

If the DAAs are really necessary, and that's never been proved, then the telephone company should supply them free of charge. After all, they are there for the telephone company's benefit, not the user's.

'With the Other Phone You Won't Have This Problem'

Letters to the Editor

ADR Customers, Unite And Meet the Challenge!

Over the years, Alan Taylor (that patron saint of DP) has been telling all of us in the profession that arrogance is our major sin. This "voice in the wilderness" has certainly needed to be heard because most of us, from hardware and software manufacturers to the daily applications programmers, have displayed this fault at one time or another.

However, last Dec. 2, in an honest display of humility, Martin Goetz of Applied Data Research again trailblazed a new road for data processing by encouraging the formation of a user group which would in no way be a front organization; be independent and self-sufficient and not accept monies from its parent organization (ADR); encourage current and constructive suggestions that ADR should implement to enhance its product for users; and strive, as its main objective, "to increase the dollar return on the user investment."

Certainly, to ask for a user group with those conditions is tantamount to saying, "we may be wrong but we will strive to be right." All of this should put Goetz right up there with Ralph Nader. It now rests with ADR customers to band together to apply these same Taylor-Nader principles and meet the challenges presented by Applied Data Research.

Hamilton Armstrong, Jr.
Syracuse, New York

Here Are Some Answers, Rumors on 370 'Extras'

In "Why Can't 370 Users Know About 370 Uses" [CW, Dec. 22] Alan Taylor raised several questions. Taking them in order:

The "extra" control memory can also be found on the 360/67. This just looks like the way IBM prefers to make architectural extensions. Note that those extra registers aren't there. No matter what you put into them, zeros come out.

Monitor Call looks like another case of Test and Set. If you will remember the introduction of the 360, TS was not in the book. It came out later and was installed on all 360's as an engineering change. The mainline system that needs the TS opcode wasn't announced for another four years: MP65.

The "totally mysterious 234" instruction turned out to be the emulator hook. If your 370 has an emulator, this instruction is active, and is documented in the appropriate software logic manuals.

The virtual memory speculations are interesting. Another rumor to add to the pot is that it was scheduled to be announced last November, and was withdrawn when RCA got out of the game. Another interesting speculation is how many lawsuits IBM would have gotten if it had announced an unspecified virtual memory operating system in 1969 for delivery in 1973. When you are trying to get information about future developments out of IBM, remember the consent decree of 1956.

John H. Roth, Jr.
Continental Assurance Co.
Chicago, Ill.

... and Another Opinion

I agree with Alan Taylor that it is intriguing to find additional hardware in the 370 that is apparently not being presently used. My own opinion is that one day we will have the ability to use control storage for portions of a control program such as O/S MVT. It can already be seen that IBM designs special instructions for second generation emulation. Providing similar instructions for a third generation control program would seem to be a logical followup.

Michael T. Cuddigan
Corporate Data Processing Center
Aetna Life Insurance
Hartford, Conn.

On DP and Peace

Your Dec. 22 editorial, "Computers for Peace," called on the computer community to support Allan L. Rudell's project to create . . . "international computerized data banks of . . . information so that all nations could draw on all the world's knowledge." He has my enthusiastic support.

At the 1963 Afips conference, I organized and chaired a session on Computer-Oriented Peace Research. In *Background: Journal of the International Studies Association,* Vol. 7, No. 2, Aug. 1963, I published a paper entitled: A Proposal for a Scientific Computer-Oriented Project on World Peace Research. That paper was revised and published in the *1965 Data Processing Yearbook* under the title: Research on the Causes of Peace. These papers call for a non-national worldwide effort to try to determine with or without the use of computers:

- The sets of conditions under which the people of the world will live at peace with each other.
- How to get from our present condition to these sets of conditions already determined.

Louis Fein
Consultant
Synnoetic Systems
Palo Alto, Calif.

Gray Founded ACS

The letter from Stephen Wiebking in the Jan. 12 issue, titled "Building Your Own Machine?", contains an invitation by Wiebking to join the Amateur Computer Society, and says information is available from me.

On the same day I got my copy of *Computerworld,* I also got a telephone call from another reader, whose second question was, "Are you active in the society?"

Just to set the record straight for future inquiries, I founded the ACS in 1966, and publish the newsletter. Steve Wiebking joined the ACS in 1970 as the 101st member, and is one of the most active.

Stephen B. Gray
Amateur Computer Society
Darien, Conn.

DP Glossary Could Help

There are new persons who are coming into the computer field who do not have a background of the various abbreviations used in your publication.

I think it would be very helpful to these newcomers to have a small glossary or index of the most used letters in your publication.

Erwin F. Chell
Director of Accounting and Finance
W. Lutheran Good Samaritan Society
Sioux Falls, S.D.

We recommend that newcomers get copies of the American National Standard Vocabulary for Information Processing, published by the American National Standards Institute, 1430 Broadway, New York, N.Y. 10018, and Acronyms, published by John P. Tuntunjian, P.O. Box 93, Jericho, N.Y. 11753. Ed.

More on Aware Machine

In the Dec. 22 issue there is an article in which it is reported that Father Gibson "has stated flatly that computers, at least the most advanced systems, have intelligence and are aware."

I disagree, most emphatically. However, I would hazard a guess that there is a problem in semantics here. If it's at all possible, I would like to hear more on the subject from Father Gibson.

Charles T. Lindholm
Computer Programming Instructor
Mid-American Business College
Springfield, Mo. 65806

End of Block, Not Batch

The article on Cosmic's Fortran IV Digital Program Changer [CW, Dec. 22] uses the phrase "end of batch." The abbreviation EOB, to which the writer was apparently referring, stands for "end of block."

Michael Gershman
Singer Co.
Ozone Park, N.Y.

The term "end of batch" appeared in the Nasa Tech Brief on the program. Cosmic tells us, however, that you are right. It should have been "end of block." Ed.

DP Industry Prejudiced?

Computerworld presents to the reader informative and interesting news concerning the DP industry. As a relatively new field, DP is capable of introducing new ideas and approaches to existing disciplines. It is therefore discouraging to note that the industry perpetuates the prejudicial sexual stereotype prevalent in our society.

In an industry which undoubtedly recognizes the intellectual contributions of women, the fact remains that women are still symbolized as clerical adjuncts to male "computer specialists." DP advertising relies on the sexual attractiveness of women models to publicize its products.

In the Jan. 12 issue of *Computerworld,* every ad (except one) using men or women portrayed each sex in its stereotypical role (i.e., women as secretaries or keypunchers, men as computer executives).

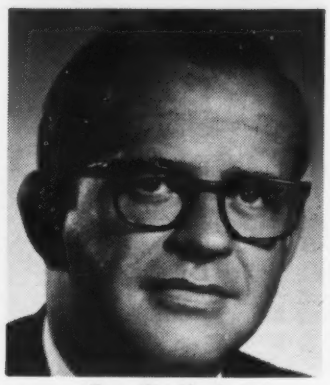
It is time for the social attitudes of the DP industry to catch up with its technology.

Joyce K. Nayer
Waltham, Mass.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Credit Card President Challenges DPers

Data Processing Must Serve the Bank Card Carrier



Dee W. Hock

The American Banker recently published an article by Dee W. Hock, president of National Bankamericard. He has since revised it slightly so as to address it more specifically to a data processing audience, and it is presented here through the cooperation of the American Banker and Hock.

By Dee W. Hock

Five years ago the national and international emergence of the bank card industry was heralded with great optimism. Three years later its explosive growth was accompanied by solemn predictions of disaster. It proved neither as good as originally claimed nor as bad as later labeled. Today it grows increasingly viable and strong and its future appears excellent.

Like any child the bank card business has taken its share of spills along the way and is still plagued by its early scuffed up image.

Yet rarely in our history has a product emerged so quickly, gained such immense acceptance rapidly and so swiftly advanced its own refinement.

The phenomenal growth of the industry is eloquent testimony to the worth of bank cards to merchant and customer. They are not a contrivance of banks forced upon an unwilling public. They developed in response to a compelling need of responsible people for economic identity outside their intimate communities.

While 50 years ago most of our lives were spent in daily personal contact with well-known merchants, neighbors and associates, they are now largely spent remote from the comfortable acceptance of our residential neighborhoods. We are now strangers to most of the people with whom we transact personal business.

The data processing industry should receive much credit for the growth of the bank card business. It has done a commendable job of structuring high-speed electronic systems to move and manipulate the mountains of data essential to our business.

At the same time we must recognize that the best and highest use of computer technology may be contrary to the most desirable and important human needs. It then becomes important to examine both moral and selfish considerations to determine which interest must be sacrificed and which served.

There are many questions which should be raised when assessing whether or not the DP industry serves customers in the best possible manner. For example:

- The greatest technical efficiency may lie at the cost of rigid cycle billing which restricts customer choice of payment date and ease in changing it. Can we seriously doubt the ability of sophisticated programs to provide more flexible customer payment options?
- It is simple, cheap and convenient to send form letters in response to machine-determined circumstances and which bypass human review. Is it not equally possible to use equipment to selectively write in precise terms to individual customers subject to the judgment and personal signature of the person responsible for the account?
- It is expected that computer capture runs, master file posting and report printing be highly efficient. Should we then accept less than an equally efficient method by which errors are traced and accounts reconstructed?
- There is excellent ability, often in less than a minute, to answer a merchant call, review records and make a major financial judgment; all to facilitate a sale. Is it possible that the same expertise and facility cannot as swiftly handle a customer inquiry?
- The customer is asked, as a condition precedent to card issuance, to complete, over his personal signature, an extensive application which is then investigated, analyzed and subjected to personal judgment as to acceptability. Should it be declined, can we reasonably maintain there is no capability to respond with a personally signed proper explanation that provides a sensible method by which the customer can seek to persuade us that our conclusion was improper?

The list of questions that should be asked is literally endless.

Motivations

There is an understandable difference in the motivation of computer hardware suppliers, DP management and programmers and those bank employees who must deal personally with the bank card users or merchant member and accept responsibility for their satisfaction.

The former must be dedicated to development of larger, more sophisticated systems for more efficient centralization of information storage processing and retrieval. The profits of suppliers and the careers of systems managers are dependent on the immediate growth of data processing and not necessarily on its effect on individual customers.

In the constant quest for efficiency and for justification of larger more sophisticated equipment it is easy to overlook the critical need in today's complex society for individuality. The success of the bank card business is in the hands of its ultimate users, all unique individuals, the consumer.

It will depend not on the greatest degree of technical efficiency but rather on the extent to which technology can enhance identity and individuality consistent with reasonable cost. Efficiency can provide cost reduction but only customers provide income. Failure without efficiency is possible, but without customers is certain.

Cybernetic Mystique

The mystique of cybernetics is certainly one barrier. The proprietary language of data processing, as well as that of a great many other businesses and professions, tends to create and perpetuate a mystery which provides a barrier to the understanding and value judgment of others.

The computer industry can be forgiven its "bits" which make up "numbers," "bytes" for "two numbers or one letter," "core storage" for "capacity," "software" for "instructions," "Cobol" and "Fortran," which are "instruction languages," and all other languages invented to enhance communication between members of the profession. It is less easy to forgive bank card management if in failing to penetrate the mystery, it permits data processing to be dedicated to its own self-interest rather than that of the customer.

To the degree that bank card management fails to exercise such direction and control, the end result is a structure that separates those employees acquainted with the customer, responsible for his satisfaction, and who rely on data to supplement their memories, from those who prepare, manipulate and provide the data.

The methods and manner with which business is conducted are thus increasingly fixed by the technical rather than the human considerations. Responsibility is divided to such an extent that no one can be held directly accountable for individual problems. Service tends to become a fragmented concept controlled totally by no one and leaving everyone to a degree frustrated and uncertain. Thus the desires and legitimate interests of customer, employee and bank can be easily sacrificed to the great god, centralization.

Needs Ignored

Yet automatic economy of scale is one of the greatest untested assumptions in both the bank card and the DP industries. Business is littered with the bones of escalating costs and loss of control through massive centralization which made mathematical sense, but which ignored the capabilities of people, the experience of management, the objectives of banks and the desires of customers.

In such cases there has rarely been an effort to measure the value of lost customers, of reduced employee morale, of diminished reputation in the community, of resultant punitive and overly restrictive legislation, and of excess management time. Whenever the great lever of centralization in a high velocity business such as bank cards is not properly balanced with equal weight on the ends of both technical efficiency and human service, one will certainly smash to the ground.

There is no doubt that centralization brought about by the quest for efficiency through use of sophisticated computers has been a valuable part of feeding and caring for the bank card child. Both the computer industry and banks should take great pride and expect reasonable profit from the value of past accomplishments to consumer and merchant.

An Obligation

At the same time, since it is axiomatic that any power for good has equal power for evil, wisdom and self-interest suggest the bank card industry examine carefully the obligation such power imposes, to see that the resultant product is the complete servant and not the master of those consumers whom the industry wishes to service.

Certainly it is easier to gain usage and acceptance by structuring the product in the customer's image rather than the customer in the computer's image. The customer simply will not be remade to suit the best technical use of the computer, or in a fashion which forces him to act and perform like all others. He treasures his uniqueness and though it may have been steadily eroded over the years, there now appears to be a universal revulsion to the loss, and a compelling demand to regain it.

The bank card industry has perhaps the greatest commercial opportunity that has been presented in a great while.

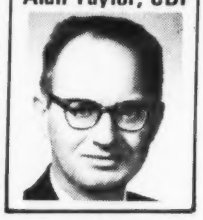
The DP industry, valuable although it has been, has yet to prove that it can enhance rather than inhibit individuality in the computer world. Trained computer people should be expected to foresee coming dangers and to show us how to avoid them.

The challenge to the computer people is clear: they must creatively ensure that people, and not paper, are the most important.

Craig Reynolds Knows Some of the Answers

While others may worry about just how to protect the public, Craig Reynolds has some ideas of his own – and when problems cropped up he simply went ahead and produced better solutions than were previously around.

The Taylor Report
By
Alan Taylor, CDP



Problems arrived, so far as he was concerned, one morning in November when the National Shawmut Bank computer department returned to Reynolds's desk a note that the deposit tape which had been sent from the Framingham National Bank, where Reynolds is in charge of the computer, had not been completely read – so that some of the balances were incorrect on the customer accounts.

Naturally, on the day itself matters were chaotic. The checks from which the deposit input had been created were now distributed to the accounts concerned – so they could not be used to update the faulty balances, and the hard copy available had to be used instead to produce new input.

And the unfamiliarity of the necessary work in preparing new input had its own problems. The first time the new input was submitted it went through as debits, rather than as credits, and that compounded problems rather than solving them! It took from Thursday to late Monday afternoon before the operations were again on an even keel, and the balances were straight again.

So far so good. A normal horror story, patched as well as possible. The professionalism of Reynolds still had not shown through. That came next, when he reviewed what had actually happened while the chaos was on.

First of all, he knew that the tape had failed and that the computer center did not notify anyone until the next morning. And he noted that the failure occurred with the really important tape – the customers' deposits. As he said, the failure of the collection tape only would cost the bank money – but the failure of the deposit tape resulted in customers' balances being recorded as lower than they were, with checks being returned when they should not have been, etc.

From then on he has been sending down two tapes – not just one. He has arranged for a call from the National Shawmut if anything goes wrong, no matter what time of night this happens.

Taylor Thoughts

He has arranged for better information to go to the people who are handling apparently overdrawn accounts in such a circumstance, so that the depositor is really protected.

In fact, he has, as Dee W. Hock wants, arranged that people, not paper, are treated as being important.

Which is the professional thing to do. (Pity that some of my deposits were among those lost).

Passing the CDP—Part 1

Review for Management Areas

By Mike Ingram
Special to Computerworld

It is difficult to administer an objective test on Principles of Management. Preparation for this section of the CDP exam is based on personal experience and a concentrated review of general management and data processing management.

Six areas merit close attention under this broad category.

The first is business environment. Within business environment, knowledge of business history will be tested. Know a little about the Industrial Revolution and Frederick Taylor. Define authoritarian and democratic leadership, distinguish between Theory X and Theory Y types of management.

Planning and decision-making together make up the second area of general management. Understand forecasting and extrapolation; associate types of planning with varying levels of management. Also briefly survey the steps in the scientific method. Define feedback and know how to relate operations research to management principles.

It is important to have a good grasp of the principles of organization, the third area. Compare line and staff concepts, and list the advantages and disadvantages of centralized versus decentralized control. Define span of control; relate vertical and horizontal integration techniques; familiarize yourself with "classical" organization charts.

Directing is the fourth general management area. Know how to relate authority and responsibility; understand the various leadership styles. It might also be helpful to review Maslow's hierarchy of needs.

Controlling concludes this brief survey of general management principles. Relate feedback to standards; define policies, plans and rules. Also consider major management control documents such as operating statements and budgets.

The last area comprises the business application areas such as inventory control and sales forecasting. Make a list of these general areas and list three or four major responsibilities within these systems. Briefly review the history of labor relations as a business application area. Surprisingly enough, there have been a few questions on micro-economics and macro-economics recently. Define these terms and pay particular attention to micro-economics.

The Feb. 19 CDP exam feverishly draws near. This article presents a brief outline of the exam and some helpful exposure to critical areas in one of the five exam stages, Principles of Management, which requires the most preparation for the data processing professional.

Review supply and demand concepts, and review decision concepts in the big run and short run. Study marginal cost and marginal review.

Five general areas of discussion were selected for DP Management – organization, controls, administration, operations management and system development management.

Organization itself has two levels. The first level tries to find a home for the DP department in the corporate organization. Review the usual homes and titles of DP departments. Study the two types of DP organizations, and define the functional responsibilities within data processing.

Review budget outlines and standards of operation used by most DP installations.

Be aware of the common administrative responsibilities within data processing such as records management, training, planning, user coordination and project control.

The fourth area of DP Management is in operations. Review the selection and evaluation procedures in hardware selection. Study the steps involved in installation site planning. Define benchmark, third-party leasing, batch, in-line, on-line, real-time, multiprogramming, multiprocessing, parallel operation, simulation, emulation, microprogramming, simplex and duplex, transmissions, synchronous and asynchronous transmissions and time-sharing.

Finally, be aware of the management concepts incorporated into systems development. Outline the steps in systems management; define a project; discuss project staffing alternatives; and note the major areas of program estimating.

Some readily available references are *Economics* by Bach; *Management Standards for Data Processing* by Brandon; *Management: Principles and Practices* by McFarland; and *Management of Automatic Data Processing* by Wofsey.

Mike Ingram, CDP, is manager for Information Services for Lenox China, Pomona, N.J. He holds a B.S. from Carnegie Mellon, and an MBA from the University of Denver. He is a member of the Society of Certified Data Processors.

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The Professional's Viewpoint

Who Should Be Allowed to Take a CDP Exam?

Entrance requirements for the Certificate in Data Processing exam are presently under attack by some members of the computer community.

The following letters illustrate the diversity of opinion on the merits of the current CDP education and experience requirements. But there is no clue as to what a consensus of DP professionals would be.

The Society of Certified Data Processors would appreciate knowing your opinion so that any necessary action to bring the CDP qualification into conformity with the wishes of the profession can be initiated on a stronger basis than a few personal opinions.

A questionnaire is provided for you to express your opinions. Comments are also invited from anyone in the profession – whether CDP holders or not – either directly to the Society (SCDP, 633 Central St., Framingham, Mass., 01701) or to the The Professional Viewpoint Page, Computerworld.

The Professional's Viewpoint page is produced by the editors of *Computerworld* in conjunction with the Society of Certified Data Processors.

Broad Education Good Professional Training

Professional qualifications are an assurance to the general public that the holder thereof, having passed a rigorous test, is quite likely to be more capable than one who has not achieved the qualifications. But this is not an absolute in any of the professional fields. It is only a probability, the degree of which will vary according to the circumstances of the moment.

DPMA undoubtedly would like to make the probability that one with a CDP is more capable than one without as high as it reasonably can. The very success of the program depends on it. A tough but fair exam, continually updated, is one means of achieving this objective. Another way is to require a broad base of education in the applicant.

All else being equal, the person with the broader education is likely to be more competent. Or to put it another way, he is not likely to be less competent.

I hope DPMA will restore the college degree requirement since I am convinced that a CDP with a degree – any degree – is likely to be more capable than one without. – Winston Brooke, CPA, CDP, Anniston, Ala.

Will the Specialist Ever Have a Chance?

My previous exposure to the CDP program (which was some years ago), revealed the examination was extremely broad in its scope.

To an individual such as myself, who has been working exclusively in large-scale operating systems for the past seven years, a number of items on (what I recall) the examination would be completely foreign to our area of expertise, such as board wiring, accounting practices, and the like.

A comment on the position towards specialists in categories similar to mine would be appreciated. – R.S. Hunt, Atlanta, Ga.

Arbitrary Five Year Rule Too Much

I was very much looking forward to sitting for the CDP exam, but upon receiving the particulars from DPMA, I discovered I was under the mistaken impression that any person with three years of experience could substitute 60 semester hours of college coursework in lieu of meeting the five year requirement.

The fact is, as I understand it, this rule only applies to those who completed their three years prior to Feb. 20, 1971. Since I began my data processing career April 1, 1968 (following college, graduating with a BS in mathematics), I find myself less than six weeks short on the experience requirement.

This came as quite a blow to me, as I was very much looking forward to receiving my CDP and becoming actively involved in your organization. I believe this industry is sorely lacking in professional standards and feel very strongly that this situation can be vastly improved through an upgrading of the CDP to a more elevated status.

As a minimum, I would at least want the CDP to attain the same meaning for a data processing professional as the CPA currently holds for the accounting profession.

I would like to propose that the rules be modified slightly so that an "either/or" situation applies. That is, I feel the dropping of the college degree requirement to be good, since it removes what was an artificial barrier to many qualified people. At the same time, however, I

(Continued on Next Page)

Professional's Consensus Could Be a Valid Guide

(Continued From Preceding Page)
feel that anyone with three years experience and at least 60 semester hours of college coursework is also very qualified to try for the CDP. – Robert B. Paulson, Arlington, Mass.

What Education Has Relevance for CDP?

Donald Olk [CW, Sept. 15, 1971] is appalled by the thought of candidates for the CDP exam not possessing a baccalaureat degree.

Does Olk seriously believe that a degree, say in Slavic languages or French history, however "difficult to attain," is better and more helpful preparation for the CDP examination than, say, several years experience as an operator or apprentice programmer?

Surely, if a baccalaureate is to be required it should be in computer science alone. If one can determine the qualification of the applicants *before* the examination, it is not needed.

Conversely, if the examination does not determine the technical qualification of those who take it, of what use is the examination?

The requirement of a college degree, per se, for candidates is solely a tool of social discrimination and of no technical merit. – Scott Herman-Giddens, Duke University.

Let Me Know When CDP Gets Harder

The individual charged with drumming up interest in the CDP exam in my local chapter has been using the argument "The exam is going to get a lot harder" as enticement for taking the exam at its next administration. I, for one, prefer to wait until the exam is as difficult as it will get before I take it.

I would very much appreciate an announcement from the DPMA when the exam is "As hard as it's going to get." – R. Fred Littrell, Raleigh, N.C.

Fill Out and Mail

Now that you have seen the various viewpoints, we would like to hear yours. This questionnaire is for your convenience, although naturally letters will be just as welcome. The matter is one of considerable importance for our profession, so please help us to reflect professional opinion.

Survey of Professional Attitudes on Education And the CDP Examination

Please circle the answers you agree with. More than one answer can be circled for each question.

1. Should "Broad" Background Be Favored Over Specialization?

a. Yes – Use entry requirements to ensure CDPers have broad background.

b. Yes – Retain the current broad examination to ensure CDPers have all-round knowledge.

c. No – Retain the current method of experience alone allowing entry to examination.

d. No – Provide a number of specialized examinations for specialists to take.

e. Other: _____

_____

_____

_____

(Continue on a separate page, if necessary)

2. Should Education in "Non-Relevant" Subjects Be Counted?

a. Yes – Ignore any difference between different academic training.

b. No – Allow data processing education to substitute for some experience required for entry to the CDP.

c. No – Allow data processing education to substitute for all experience required for entry to the CDP.

d. Other: _____

_____

_____

_____

(Continue on a separate page, if necessary)

3. Should the CDP Examination Be Made More Difficult?

a. Yes – Indefinitely.

b. Yes – Until 19

c. No – It should stop as it is.

d. Other: _____

_____

_____

_____

(Continue on a separate page, if necessary)

* * *

When you have completed the questionnaire please mail it to:

The Society of Certified Data Processors c/o The Professional Viewpoint Page
Computerworld
797 Washington St.
Newton, Mass. 02160.

Thank you.

Name _____

_____

Address _____

_____

_____

CDP Holder? Yes ☐ No ☐
SCDP Member? Yes ☐ No ☐

City to Reorder Priorities

JACKSONVILLE, Fla. – This city's Community Planning Council will employ a computer to determine how to best allocate resources to combat local social problems.

James Music, assistant executive director of the council, explained that plans for the study are now being formulated with the voluntary assistance of Computer Power, a local service firm. The council's present workload will not permit the study to begin before June, Music said, but planning has begun on how to best utilize the computer in the study.

Music pointed out that similar projects are being undertaken or are under way in other cities, but this study is being geared to Jacksonville. "We are also getting planning help from the United Way of America," he said.

The aim of the project is to set priorities on local social problems and analyze the effectiveness of programs designed to combat these problems. Since funds are limited, it is hoped the study will offer suggestions as to how to best allocate them. "We will use census figures and make our analyses by neighborhood," Music explained. "We hope to learn what the various organizations are doing to solve problems, if the organizations are doing what they say they are doing, and how effective are the results. We will feed addresses to the computer and use the output to make decisions."

Crime Prevention Gets More DP Funds in Calif.

SACRAMENTO, Calif. – The computer's role in crime prevention has been boosted by grants of $2.5 million awarded to various government instrumentalities by the California Council on Criminal Justice (CCCJ).

Under an earlier grant, experts are analyzing crime data transmitted by satellite between Florida and the California Department of Justice here.

The largest of the later year-end grants was to Los Angeles County, $1.64 million for second-year funding of the development of the Regional Justice Information System.

The State Department of Justice was also awarded $835,000 in additional funding for the California Justice Information System, a real-time information system under development.

CCCJ awarded the funds as part of its task of administering federal money under the Law Enforcement Assistance Administration (LEAA).

The grant to the state Department of Justice followed still another, earlier, million-dollar grant approved by CCCJ last June.

Another grant went to the city of San Bernardino, $61,000 for the use of computer simulation techniques to test the Municipal Court case scheduling approaches.

Satellite Crime Data

Under the separate two-state grant, technicians and scientists are studying a mass of data collected during recent experimental satellite transmissions of fingerprints, mug shots and "rap sheets" between California and Florida.

The experiment used earth stations to transmit crime data via Nasa's ATS-1 satellite, orbiting 24,000 miles over Australia, according to an official of CCCJ.

The experiment was assisted by a $210,000 grant from LEAA, and was designed to test the feasibility of using a satellite for the high-speed transmission between states of crime data, primarily high resolution fingerprints, CCCJ said.

School Data Consolidation Aim of MIS Prototype

LOS ANGELES – The Unified School District has received a Health, Education and Welfare Department grant to develop a computer-based management information system that may serve as a model for other large urban school districts.

Called Aims (Automated Instructional Materials Services), the system will be providing administrators, teachers and students with a central source of information for the entire array of learning materials stocked by the school district.

The $234,102 project will be a prototype to help educators who are finding it increasingly difficult to keep track of a variety of books, tapes, films and other classroom aids that have recently inundated school systems.

Burton E. Lamkin, associate commissioner of the Bureau of Libraries and Educational Technology, which is monitoring the project, calls Aims "unique, in that it will consolidate information on both audio-visual products and print materials into one easily accessible data bank."

DP Car Pool Slated for Honolulu

HONOLULU – In an effort to reduce this city's rush-hour traffic, as well as air pollution, Honolulu is attempting a city-wide computerized car pool system.

Residents will fill out cards saying where they live and work. A computer will then select five commuters to share the same car.

The plan will begin by pooling 7,000 city employees, but city officials hope to expand the system to the entire city's work force.

DP Means Bonus Holidays

SYDNEY, Australia – More than 1,000 employees of one of Australia's largest finance companies will be receiving a day-off with pay once a month, thanks to the company's computer system.

Since the computer has taken over a large part of the work, said managing director William M. Edmends, "we can afford to give our employees more leisure time."

Random Notes

Infonet Service 'Skeduls' Telephone Traffic Offices

LOS ANGELES – Telephone traffic offices still using manual methods to schedule work shifts for 50 or more operators can do the job more efficiently with the Skedul service recently announced by Infonet, Computer Science Corp.'s time-sharing network.

The service generates optimal schedules by quarter-hour periods based on estimated work loads and user-defined levels of service to be maintained. Information from the Force Administration Data Systems (Fads), installed in many offices to measure usage, can be used as input for Skedul, Infonet said from Century City, 90067.

ILA Packages Available In Source or Object Code

CEDAR RAPIDS, Iowa – Cobol source programs for the ILA "family" of insurance systems, which operate on NCR Century, Honeywell, Univac and Burroughs tape and disk configurations, are now available from Network Data Processing Corp. (NDPC), 321 Third St., S.E., 52407.

APL *Service Adds Applications

CHICAGO – Budget preparation, sales projections, spread sheet analysis and forecasting are among the conversational business systems currently available on a time-shared basis from Computer Innovations and the associated vendors of the APL*Service network.

Inventory control and analysis, general ledger accounting and other "bread-and-butter" applications are also being provided. Subscribers need not know APL, the source language of all these capabilities, in order to use them, Computer Innovations noted from 70 W. Hubbard St., 60610.

EAI 'Curls' Plotter Output

WEST LONG BRANCH, N.J. – A software package called Curls has been released by Electronic Associates Inc. (EAI) to generate curved letters and symbols similar to those produced with manual lettering devices, on the EAI 430 Dataplotter attached to IBM 360 or 1130, Univac 1107 or 1108, or CDC 6000 mainframes.

The basic package consists of 64 alphanumeric characters and symbols which may be italicized left or right. Curls can be used with or instead of the common plotter routine, Symbol, and costs $500.

LSD Package Uses 1108

'XBasic' Backs Delphi Conferencing

By Don Leavitt
Of the CW Staff

SILVER SPRING, Md. – An interactive conference system that permits participants to contribute, review and vote on material under discussion is available as a byproduct to users of the enhanced XBasic language processor from Language and Systems Development Inc. (LSD). The 1108 Delphi Conference System is described as a combination parliamentary chairman, rules chairman, member proxy and stenographer.

Once a conference is organized, on any subject, the system's functions include recognizing and conversing with each conference member on a personal, individual basis, and also providing conference proceedings as anonymous information to the group. It asks comments, proposals, discussion items or votes from each member, according to the privileges granted him by the conference "monitor" or chairman.

The system records the minutes of each member's sessions with the conference, for subsequent, anonymous playback to the group or specific, identified playback to the monitor. Since members do not have to meet face-to-face for a Delphi conference, they are rarely required to be at their terminals at the same time, LSD noted.

The system has at each terminal the latest 100 messages, or blocks of textual data used for discussion, and 50 items, or data presented to each voting member for his consideration.

The system itself accumulates and reviews votes on items, advising the monitor of the group's consensus once at least 80% of the votes are in. Once created, an item may be dropped only by the monitor or by the 50-item dropout rule.

Delphi Conference coding is re-entrant and requires 16K plus 7K words of 1108 storage for each conference member. It is available without additional cost to users who lease XBasic for $950/mo for a year.

LSD is at 8121 Georgia Ave., 20910.

Data Base Management Combined With Report Writing by 'Ramis'

PRINCETON, N.J. – The Rapid Access Management Information System (Ramis) from Mathematica, Inc. permits the user to describe, build and maintain data files, and to retrieve information from the files to display it in report formats or pass it to other programs.

Thus Ramis, available for in-house use on IBM 360s, including the 360/67, or as a time-shared service through National CSS, combines the capabilities of both data base management systems and report generators. It is controlled by English-like statements which are virtually free of special syntax rules, according to the company.

All data files maintained and used by Ramis must be created by the system. Files generated elsewhere must be reformatted into the "tree" structures which the system supports.

A Ramis data base may consist of several independent files stored on random access devices, generally disk packs.

In addition to providing easy updating of the data base and formatting of the reports, Ramis is said to provide stronger calculating power than many competitive systems.

Logical operations include support for IF . . . THEN . . . ELSE . . . statements, in which the expressions and results may be either mathematical or logical expressions.

User-written programs in BAL, Cobol or Fortran can be linked into Ramis through Calls.

Ramis can function in a 150K byte batch partition under OS/360. It is also available for use under CRJE and TSO, or CP/CMS on the 360/67.

Ramis is available for $21,000 from PO Box 92, 08540

'Sprint' DOS Spooler Enhanced

MANTECA, Calif. – The capabilities of the Sprint spooling-job accounting package from Jason Data Services [CW, Sept. 29] have recently been improved to support card readers as well as punches and printers.

Users can also now load several copies of Sprint simultaneously so that spooling can be done for more than one DOS partition at a time. Previously, Sprint would only support one partition, Background, according to Jason.

To avoid conflicts with DOS, which does not permit more than one partition to utilize the same physical address for an I/O device, Sprint has been extended to support imaginary devices.

In this operation, the user sets up addresses for two printers, for example, even though only one really exists. Sprint will spool the output for both the real and the imaginary unit and redirect it all to the shared real device, taking into account the need to keep the two outputs separate.

The disk-oriented version of Sprint has been recoded, so that users can spool both printer and punch output in a minimum of 4K of core. The earlier disk version required 6K of core, the company said.

With a feature scheduled for release in the second quarter of this year, users will be able to load Sprint in upper core, outside of the DOS partitions, so that as many as three jobs running in the partitions can be spooled simultaneously. The basic Sprint package is available for $95/mo.

There is no charge for the reader spooling or imaginary devices features, but optional monitor needed to control the spooling from multiple partitions adds $100/mo to the user cost.

Jason Data Services is at 903 E. North St., 95336.

Datacraft Adds Disk Monitor for Minis

FT. LAUDERDALE, Fla. – The Disk Monitor System (DMS), recently released as an extra-cost option by Datacraft Corp., allows users of the company's 6024 line of CPUs to handle real-time tasks and batch processing concurrently.

In foreground, DMS supports priority-oriented multiprogrammed applications such as process control or data acquisition. The background under DMS handles batch processing and is serviced when CPU time and memory are available.

The real-time tasks can be core-resident or catalogued on disk and are initiated by external interrupts, by the console keyboard or by other foreground tasks. In addition, a timer scheduler can trigger programs in a predetermined sequence.

If available memory is not large enough for the foreground being initiated, background processing is suspended, under control of a roll-in/roll-out technique.

The DMS package, available immediately for $5,000, requires a teletypewriter console and a disk unit attached to a 12K 6024 CPU. The system can be used with fixed head, moving head or cartridge-type disk systems, Datacraft said. The firm can be reached through P.O. Box 23550, 33307.

The Other Computer Company strikes again: RESPONSE/2000.

We took a long hard look at the computer marketplace and decided that what the computer user needed was not just more of the same but a whole new capability, not just more confusion but a justification for his computer expenditures, not just more problems but better answers.

Honeywell's response: RESPONSE/2000.

RESPONSE/2000 is a family of medium-to-large computer systems with new operating system software. These lean, fast, cost-conscious Series 2000 systems are especially capable in important areas like data communications and data base management.

RESPONSE/2000 includes DATANET® 2000, a new data communication technique using front-end hardware and software to relieve the central processor and increase information throughput.

RESPONSE/2000 includes OS/2000, a new operating system especially designed to support Series 2000 data communications and data base management capabilities.

RESPONSE/2000 is all these things, and one more thing: RESPONSE/2000 is dedication, a commitment on our part to making your computer system a cost-justifying profit center within your business.

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SERIES 2000 MODELS					
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Cycle Time	1.6 μs/char	1.6 μs/2 char	1.14 μs/2 char	1 μs/4 char	.75 μs/4 char (each processor)
I/O Channels (all variable speed)	12	12	16	16	32
Peripheral Address Assignments	32	32	48	80	192
Operating Systems	OS/200, OS/2000, Mod 4				Mod 4 High Up-Time System
Other Features					
Interactive CRT Console (1920 Char. screen)	Opt.	Opt.	Opt.	Std.	Std.
Other System Elements	All Series 200 peripherals plus DATANET 2000				(DATANET 2000 Not applicable)
Floating Pt. Hardware	Opt.	Opt.	Opt.	Std.	Std.

DATANET 2000

Processor – Programmable miniprocessor; 24K to 65K 8-bit characters of memory; effective cycle time 385 ns/8-bit character.

Processor/CP Interface – Coupled to Series 2000 control processor via 83KC high-speed interface.

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- Multiprogramming – multi-partition access for up to ten jobs plus five data transcription routines processed concurrently.
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The Other Computer Company:

Honeywell

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WU Dial-Up Extensively Used

By Ronald A. Frank
Of the CW Staff

JEANETTE, Pa. – If you're a communications user who normally transmits a large volume of data for short periods of time, Western Union's Broadband Exchange service may fit your needs.

The Elliot Co., a technical engineering machinery firm, uses the WU dial-up service to connect its dual 360/30s with four regional offices.

The company utilizes the Broadband Exchange facilities to handle both customer service orders and the transmission of engineering and technical design data.

Regional Office

A customer order is first sent to one of Elliot's regional offices in Los Angeles, Houston, Chicago, or New York. At the regional site, pertinent information is transcribed with Friden Flexowriters onto paper tape.

The regional center then dials the company headquarters to transmit its data. With the alternate voice capability, operators can synchronize transmission times. Data is transmitted via WU 311 terminals (supplied by Tally Corp.) that handle paper tapes at 1,200 bit/sec. Slower service at 600 bit/sec is also available under the Broadband Exchange offering.

In its engineering application, Elliot uses the dial-up transmis-

Communications

sion service to validate customer specifications for complex equipment. The 360s are used to calculate the detailed performance required by each customer.

When data is received at the Elliot home office, the punched paper tape from the 311 terminal is fed into an IBM 047 tape-to-card converter. The card data is then transferred into the 360.

Tape-to-Tape

Elliot is presently experimenting with key-to-magnetic tape terminals at each remote site, according to Joseph Kemerer, supervisor of service parts data input. With data on mag tape, a direct tape-to-tape (magnetic instead of paper) transmission would be possible using the Broadband Exchange lines.

In addition, Elliot plans to add a remote terminal in Zurich, Switzerland, to its Broadband Exchange net with the international facilities of RCA Global Communications, Kemerer said.

Using the Western Union Broadband service, Elliot has saved about 40% compared with the cost of a private line from Bell, Kemerer said. In addition it has a dedicated private system available on demand whenever an operator dials another station.

Western Union provides the Broadband Exchange service in most major cities on a timed-charged basis, with a minimum one-minute rate.

With the Broadband service, users can dial either a 2 KHz channel with a 1,200 bit/sec capability; or a 4 KHz channel which can handle data up to 2,400 bit/sec. WU expects to add 4,800 bit/sec service in the future. About 400 subscribers are now using the Broadband Exchange, but a total of 1,000 could be handled by the dedicated 4-wire network, according to a Western Union spokesman.

CTC Expands Optran Infrared Unit Line

LOS ANGELES – Computer Transmission Corp. has introduced two new models of its Optran infrared transmission device that are compatible with existing data speeds.

The Optran units enable users to transmit synchronous data at 2,400, 4,800 or 9,600 bit/sec over line-of-sight optical links, up to one mile. Longer distances are possible with repeater units, according to the company. About 15 Optran data links are in operation, a spokesman said.

The new units, designated 1811 and 1831, are used with interfaces that can be located up to 500 feet from the optical transmission unit. The 1811 has a stand-alone interface, while the 1831 has a printed circuit board interface which can be mounted in a nine-board Data Set Master unit.

Data speeds are switch-selectable on both Optran units. The 1811 is priced at $2,950 and the 1831 costs $2,400. Delivery is 30 days. The firm is at 1508 Cotner Ave., 90025.

OTP Study May Find Best System

WASHINGTON, D.C. – The communications policy office of the White House will soon begin a study to determine whether current communications equipment and services best fill the needs of users.

The Office of Telecommunications Policy (OTP) will undertake the study to find what steps are required to optimize teleprocessing systems both from a cost and efficiency standpoint.

While the study may sound theoretical to communications users, OTP can make specific recommendations to the FCC with the support of the administration. This would probably put some pressure on the FCC to implement any suggestions in the form of specific services.

The first step in the OTP study is expected to be a computerized time-shared model of the vital parameters that affect a computer/communications system. It is expected that the model will be written in Basic for use on the Call/360 service of SBC.

With the proposed approach, it is possible that new CPUs, peripherals and more customized data services could be recommended by OTP.

Bits & Pieces

Sense-Marked Cards Sorted at 1,000 CPM

SAN DIEGO – A high-speed mark-sense card sorter, from Digital Development Corp., is designed to eliminate keypunching by sorting mark sense cards directly.

The DDC Sorter 1000 optically reads both sides of a card at 1,000 card/min. The sort/selection sequence is programmed into the unit with a program deck of up to 256 instructions that precedes the data.

DDC Sorter 1000 prices start at $750/mo and delivery is 90 days from 5575 Kearny Villa Road, 92123.

Paper Tape Controls Terminal

POMPTON LAKES, N.J. – An automatic letter writing terminal, the Holmes Tycom 35/37 Model from Tycom Systems Corp. can use computer-prepared punched paper tape to produce 20 letter/hr.

The Selectric-based unit uses two paper tapes, one with the standard letter, the other with the information that is individualized for each letter and which can be extracted from computer files.

The printer is priced at $5,900 and available in 30 days from 750 Hamburg Tpk., 07442.

Kit Checks 1316 and 2316 Packs

HILLSDALE, N.J. – The self-contained System-316 multipurpose disk pack inspection kit from the Texwipe Co. is compatible with 1316 and 2316 disk packs.

Designed to check disk pack alignment, runout deviation and surface condition, the device uses a comb gauge for preliminary inspection. A sensor is used to measure runout and the surface is checked with a precision mirror and high intensity light.

The System-316 is available for immediate shipment at under $1000.

Safe Guards Packs From Magnets

CANTON, Ohio – The Data-Safe from Diebold, Inc. is designed to protect disk packs and magnetic tapes from magnetic waves which can scramble data, as well as from fire, heat, smoke, humidity, vandalism and theft.

The safes are available in sizes to 80 in. by 65 in. by 35 in. and can be equipped with key locking handles and combination locks.

Operator Chooses Print Speeds

SAN DIEGO – The DP-30 desk-top terminal from Typagraph Corp. prints a 94-character, upper/lower case set at speeds of 30, 15, or 10 char./sec, operator selectable.

The typewriter-like unit handles standard pin feed paper and features a buffered input that permits operations from either printer or CRT ports.

The unit leases for $95/mo and is available on a 60-day delivery schedule form 7547 Convoy Court, 92111.

Low-Cost Case Protects Tapes

CARLSTADT, N.J. – Plastic containers, originally designed for the shipping of movie films, are available in a variety of sizes for reels of computer tape from the Plastic Reel Corp. of America.

The cases are available in a variety of colors and are priced at $2.25. Delivery is one week from 640 S. Commercial Ave., 07072.

Main Memory, Disks

370 Users Offered Alternate Source

By Frank Piasta
Of the CW Staff

SAN FRANCISCO – Itel Corp. has joined the fast-growing movement to supply independently produced peripherals to IBM 370 users by announcing the first solid-state main memory replacement as well as a 3330-compatible disk drive.

The memory offers the user of 370 models 135 through 165 a more compact storage medium, at lower cost, that is transparent to the 370 system. Cycle times of the Monolithic Main Memory Extension are sufficiently high to allow the systems to function at their normal levels of performance.

Exact Replacements

The Itel 7330 Disk Drive and 7830 Storage Control Unit are designed as exact replacements for the IBM 3330/3830 storage system, while offering the user greater flexibility in configuration, higher performance and lower cost.

The Monolithic Main Memory Extension is similar to the Advanced Memory Systems memory units that Itel has been offering as memory replacements for the IBM 360 models 30, 40, 50, 65 and 67.

It uses a basic memory element formed by a semiconductor chip which contains 1K bits of storage. Thirty-two chips are mounted on each storage card, which are in turn combined into basic storage modules containing an amount of storage equal to the IBM memory upgrades.

The compact nature of the circuitry allows up to 2,048K bytes of storage to be contained in one cabinet measuring 32 in. by 62 in. by 72 in., about the size of an IBM 3360 cabinet used to hold 512K bytes on the 370/155 or 165.

Memories are available in capacities from 48K to 256K bytes for the 370/135. A fetch takes 770 nsec and a store, 935 nsec, for two bytes. Memories for the 145 can be had in sizes ranging from 48K to 512K bytes. Fetch time is 540 nsec for eight bytes, with store time 607 nsec.

Models for the 155 and 165 come in capacities ranging from 512K to 2,048K bytes. Cycle time for the 155 model is 2.070 μsec for 16 bytes. The 165 model has a cycle time of 2.0 μsec and offers four-way interleaving.

Prices of the Monolithic Main Memory Extensions will be about 10% below IBM prices for leased systems and 20% below IBM for purchased units. First deliveries will be made in June 1972.

7330 Disk Drive

The Itel 7330 disk drive is built by the ISS subsidiary and features total compatibility with the IBM 3330 while offering average access time that, at 27 msec, is 10% faster than that of the IBM drive. The Itel drive uses the same IBM 3336 pack with a capacity of 100 million bytes. Data format is identical to the IBM device, Itel said.

Configurations of the Itel units can be more flexible than that of the IBM drives because the 7330 is available in single drive modules.

In most other respects, the Itel 7330 and its associated 7830 controller are identical with their IBM counterparts, with price the exception. The 7330/7830 will lease for about 10% below IBM prices and sell for 20% less. First deliveries are scheduled for the fall of 1972 from One Embarcadero Center, 94111.

Low-Cost Tape Drive Offered To Inforex Key-to-Tape Users

BURLINGTON, Mass. – To make it possible for IBM 360 users with disk-oriented systems to use its keyboard-to-tape systems, Inforex is supplying low-cost magnetic tape drives to its customers to attach to their computers.

Intended to supply a magnetic tape capability for users who have none at present, the drives, called 2401, are built by Inforex and can read and write 9-track 800 bit/in. tapes on 1200-ft reels.

The drives, Inforex said, include standard read/write error checking as well as vertical and longitudinal parity checks, and include write-enable ring protection. The drives cannot handle records shorter than 16 characters.

The 2401 appears to the 360 as if it were an IBM 2400 series tape drive, Inforex said, attaching to either the selector or multiplexer computer channel. The 2401 includes one tape deck with a transfer rate of 10K byte/sec and a tape speed of 12.5 in./sec. The nominal interrecord gap length is 0.6 in. and rewind is at 60 in./sec. The tape drive is powered up and down in a manner that does not disturb the channel or host computer, Inforex said, and is designed to respond properly to IBM software recovery procedures.

2401 Magnetic Tape Drive

The price of the Inforex drive is $250/mo or $12,000. The lowest priced IBM unit for attachment to the 360 is the 2315, with a tape speed of 18.75 in./sec, which rents for $750/mo for two drives. This price decreases to as low as $630/mo on a 24-month lease.

First shipments are scheduled for April 1 on a three-month delivery schedule from 21 North Ave., 01803.

Disk System for HP2100 Minis Includes 3 Operating Systems

SUNNYVALE, Calif. – Hewlett-Packard 2100 series minicomputer users can use a disk system from Daconics Corp. with extensive software support and low cost.

The company, which claims to offer more complete software support for H–P compatible peripherals than any other source, also includes H–P-compatible magnetic tape drives, Selectric-based terminals and line printers among its products.

The disk drive used in the 2923 Disk Memory Subsystem is a Diablo unit with the IBM 2315 disk cartridge. Data capacity is 1.22M 16-bit words of storage. Average access time is 70 msec.

As many as four drives can be connected to the Model 2923 controller, built by Daconics. Error checking, through a cyclic redundancy check, is performed by the controller which is attached to the minicomputer through the DMA (Direct Memory Access) channel.

3 Operating Systems

The user can choose one of three operating systems for use with the disk system. The Disk Operating System, intended for batch processing as well as assemblies, edits and compilations, is supplied at no charge.

The real-time executive, priced at $2,000, is intended to handle such activities as data acquisition, process control and data communication on a time priority basis in foreground, while background is used for batch jobs. A minimum of 16K memory is needed.

The Disk Based Auxiliary Memory System is also priced at $2,000 and operates under the standard H-P Basic system which permits disk data storage and retrieval under Basic commands. Basic programs can be stored and recalled for execution from the disk as well as linked to other Basic programs.

The Model 2923 Disk Memory Subsystem is priced at $10,950 for the controller and one drive, with each added drive costing $5,200. Maintenance is negotiated, the company said. Delivery is 60 days from 925 Thompson Place, 94086.

Printer Stresses Speed, Silence

RICHMOND HILLS, N.Y. – A dual-purpose, drum printer from Vogue Instrument Corp. which stresses high speed and quiet operation is intended for use with minicomputers and as a telecommunications terminal.

The Model 400C printer is compatible with all major minicomputers, including the PDP-8, PDP-11, PDP-15, H-P 2116, Nova, Honeywell 316 and 516, as well as Western Electric 201, 202 and equivalent modems, according to Vogue.

The 400C is said to offer speeds up to 100 times faster than conventional Teletypewriters with a speed of up to 600 132-character line/min. As many as six copies can be made. Up to 300,000 lines can be printed with a single standard inked ribbon because of a ribbon-reversing mechanism, the company said.

Vertical format is controlled with an 8-channel paper tape.

The Vogue 400C printer is priced at $9,800. Maintenance for the Vogue printers will be provided by the service division of GT&E Informations Systems, Inc., including installation and preventive maintenance and service. Delivery is 60 days from 131 St. at Jamaica Ave., 11418.

Psychologists Study Human Interplays Using Coupled Batch, Real-Time CPUs

Several psychology departments have acquired computers for special projects. The University of Colorado designed its Computer Laboratory for Instruction in Psychological Research (CLIPR) for a broad band of educational activities.

Under director Dr. Daniel E. Bailey, the laboratory initially served psychologists by performing statistical analysis on problems, the size and complexity of which had previously imposed major limitations on the scope of research and the depth of analysis of experimental data.

Further developments at CLIPR have led to an increase in the sophistication of quantitative methodology, an improvement of psychometric and statistic methodology and general freedom in the design and execution of experiments. Programs are devised to select subjects according to a randomization scheme, produce visual display materials for the experiment, etc.

J. Daniel Couger
On
Education

Couger is professor of Computer and Management Science at the University of Colorado.

Behavior Theories

With increasing experience, psychologists are beginning to use computers as tools in building theories of behavior – simulation of theorized processes could play a role in psychology similar to the role mathematics has played in the physical sciences.

Ordinarily, in academic institutions, computer users access a central, general batch-oriented processor supported by the entire community.

The amount of real-time services that can be extended through such a computer center are essentially negligible. Generally, two distinct types of facilities are needed to service the two types of demand.

Real-time computers tend to be dedicated to a single purpose or restricted mission environment and to be separate from the central computer center. A useful arrangement is to use a "coupled" system, with the real-time computer linked to the central computer as an input-output station. The real-time computer can use the facilities of the centralized CPU for data analysis, storage of programs and storage of data.

Real-time research at CLIPR falls into three general categories: the monitoring of bio-electric systems for data collection, instrument control and data collection in experimental psychology, and computer-assisted instruction.

The research also deals with verbal learning, problem solving and concept formation.

CLIPR studies also include analysis of component processes and the role of organizational processes in overcoming intratask interference in complex verbal learning tasks of the serial, paired-associate and free-recall variety.

A number of experiments in basic perception will be performed using the CLIPR facilities. One of these uses the computer to study recognition and identification of patterns by human subjects when perceptual stimuli are presented in a way so as to involve pattern uncertainty.

Another experiment is examining gaming-simulation which optimally requires the use of an on-line computer.

This technique of developing and testing hypotheses about the characters of the interaction and the development of accommodations and decision trees is perhaps most sophisticated in the areas of interaction of person, groups and organizations. A theory of international relations, for example, can be expressed as a computer model.

Interacting with the model, and with other players in international affairs games, each player provides information to the computer regarding the player's mode of decision-making, learning and communication capabilities.

The primary equipment for the laboratory is an XDS Sigma 3.

Nose Cones Into Plowshares?

Special to Computerworld

MADISON, Wis. – A computer with a nose cone?

That's what the computer science department at the University of Wisconsin is using.

The machine, a former D17-B Minuteman missile guidance system, is the focus of much interest – and work.

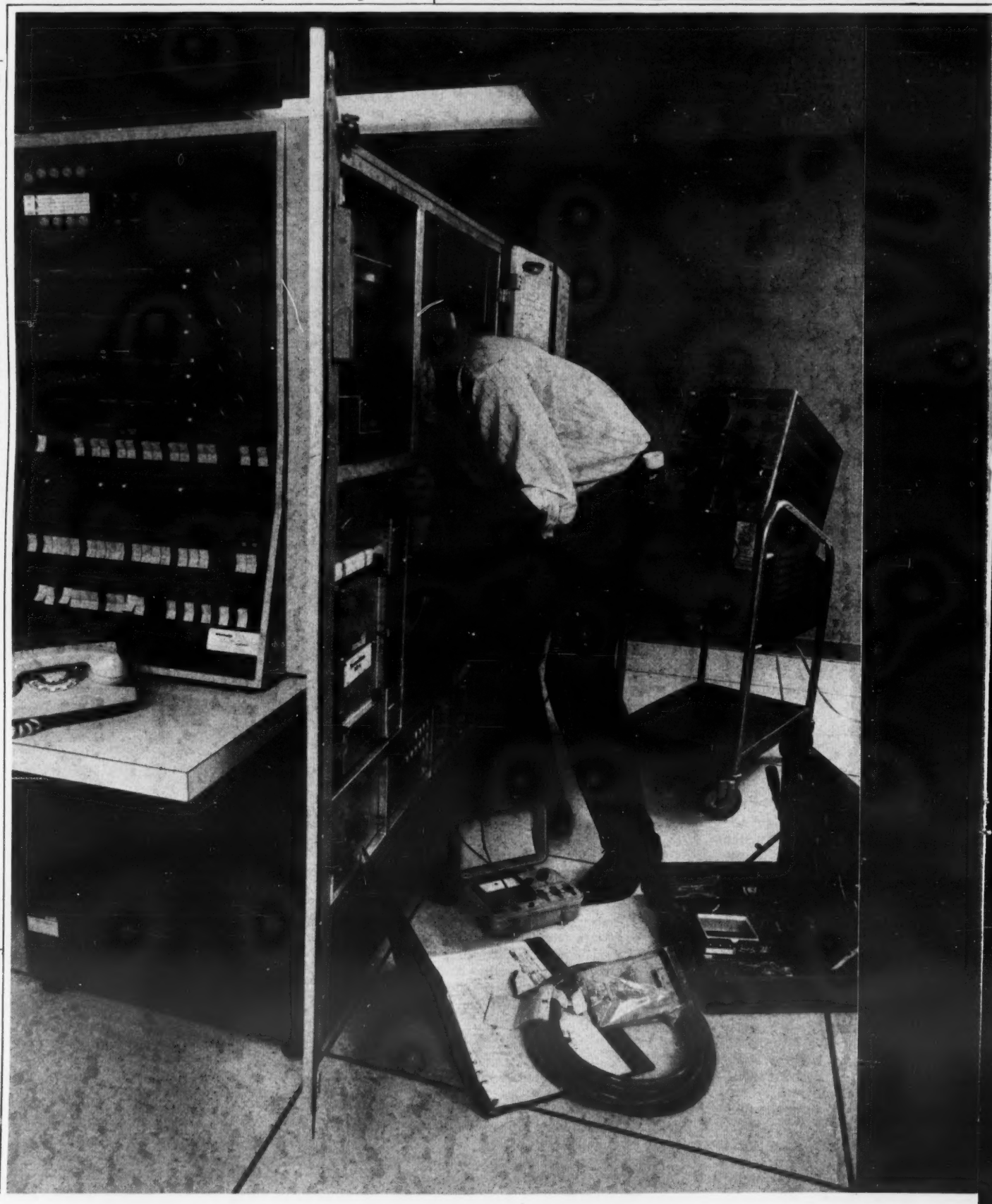
The processor which cost the government about $250,000 when it was purchased from Autonetics, was surplus and made available to the university free of charge. Before it could be used a power supply, a control console and input/output devices and controllers had to be constructed and attached.

There were other problems. All of the software was classified and could not be used. Much of the documentation was only of historic interest to the university and neither spare parts nor maintenance were available.

Before delivery, the military required that the disk memory be degaussed three times to insure purging it of classified information.

The computer science students were then assigned hardware and software development tasks. A cross-assembler, soon to be run on Wisconsin's Univac 1108, will generate D17-B code.

About 100 D17 owners have banded together to form a Minuteman Computer Users Group. But only about five of the 100 installations actually have their D17s running.



IEEE Group Expands Role

WASHINGTON, D.C. – In a move away from strictly technical orientation, the Computer Society of the Institute of Electrical and Electronics Engineers (IEEE/CS) is planning symposia on overseas marketing and minicomputer uses and trends.

The minicomputer meeting is March 1, at the National Bureau of Standards, in suburban Gaithersburg, Md. A chief feature will be panel sessions on buying minicomputers and on their "use and abuse," a spokesman said.

The marketing symposium is March 2, at the International Club, and is designed to help small and medium-sized U.S. companies enter foreign markets or improve business abroad, IEEE/CS said.

Information is available from P.O. Box 639, Silver Spring, Md. 20901.

U.S., Japan 'Split'

TOKYO – Down-the-middle splits in both exhibits and technical presentations are planned for the U.S.-Japan conference here in October, officials said.

Stress will be on subjects of "common interest and common concern" to the computer community in both countries. Speakers from the U.S. and Japan will be asked to analyze past developments, and to identify factors influencing future actions.

The conference is sponsored by the Information Processing Society of Japan, and the American Federation of Information Processing Societies.

The French Have Their Pick

PARIS – There are over 70 DP associations in France, according to the Journees Internationales de L'informatique et de L'automatisme (JIIA), which organizes the annual DP user conferences here.

ACM Announces May Candidates, Lays Claim to Membership Lead

By a CW Staff Writer

NEW YORK – A subtle claim to first place in society membership has been made by the Association for Computing Machinery here.

In the current issue of *Communications*, the official monthly publication of ACM, the organization reported membership at an all-time high of 27,183 and asked, "does this number make ACM the largest international society in the data processing field?"

Societies/ User Groups

ACM has also announced the candidates for next May's election. Anthony Ralston (State University of New York at Buffalo) and Leland H. Williams (Triangle Universities Computation Center, North Carolina) will campaign in an effort to succeed Walter M. Carlson of IBM as president.

Both vice-presidential candidates are IBMers: Jean Sammet and William Lyons. Members-at-large and regional representatives will also be elected in the mail voting.

The names were chosen by a nominating committee headed by Carl Hammer.

More Nominees

Additional nominees can be placed on the ballot if members submit petitions containing signatures of at least 1% of ACM's members, or about 272 signatures (as of last Oct. 31).

The nominating committee cautioned members contemplating placing additional names on the ballot that, if biographical sketches are to be published in *Communications*, the nominating petitions must reach headquarters here by Feb. 28. The association is at 1133 Avenue of the Americas, 10036.

ACM also announced the availability of the proceedings of its last two national meetings. The 1970 version is called *Computers and Crisis*, and was edited after the seminar-type discussions.

'Dialogue'

The 1971 *Proceedings* continued the theme of "decade of dialogue" with the public, and deals with standards, I/O interfaces and communications, among other topics.

In a separate announcement, ACM's largest Special Interest Group (Programming Languages, or Sigplan) said a new informal bulletin would feature extensible languages, those that allow users to augment their syntax and semantics.

Additional information can be had from Christopher J. Shaw, editor of the group's monthly newsletter *Sigplan Notices*, at Xerox Computer Services, 5310 Beethoven St., Los Angeles, Calif., 90066.

Calendar

Feb. 1-3, Atlanta, Ga. – **CAD/CAM, Computer-Aided Design and Computer-Aided Manufacturing Conference** sponsored by the Society of Manufacturing Engineers. Contact: Society of Manufacturing Engineers, 20501 Ford Road, Dearborn, Mich. 48128.

Feb. 9-11, New York – **Information Systems Planning and Design Workshop. Also Planning and Implementing Data Communications Systems Seminar** on Feb. 14-16. Contact: The American Management Association, 135 West 50th St., New York, N.Y. 10020.

Feb. 14-15, Philadelphia – **Conference on Psychology of Technical Communications.** Contact: IEEE, 345 E. 47th St., New York, N.Y. 10017.

Feb. 17-18, Dallas – **Adapso Management Conference.** Contact: Association of Data Processing Service Organizations, Inc., 551 Fifth Ave., New York, N.Y. 10017.

Feb. 22-24, Anaheim, Calif. – **Computer Systems Design '72** sponsored by Computer Design, ISCM. Contact: Industrial & Scientific Conference Management, Inc., 222 W. Adams St., Chicago, Ill. 60606.

March 7-10, Pittsburgh, Pa. – **Computer Graphics in Medicine Symposium** sponsored by the Special Interest Group for Computer Graphics (SigGraph) of ACM. Contact: Dept. of Computer/Information Science, Point Park College, 201 Wood St., Pittsburgh, Pa. 15222.

Contractors Get Research Plan

PHILADELPHIA – To provide efficient computerization applicable to contractors' operations in the construction industry, the General Building Contractors Association, Inc. (GBCA) has developed a research program to optimize contractors' performance and realize better job cost control, improved scheduling of job progress and accumulation of helpful historic cost data from each job. Also, the program could eliminate personnel overtime.

Other information could be included, such as data banks of industry-wide information on building products, construction costs, projects scheduled for construction, and manpower requirements.

The program, limited to eight months, will be managed by Mary Reckner, formerly assistant executive director of GBCA. According to Miss Reckner, the program will try to bridge the apparent gap between the attempts of computer manufacturers and service bureaus and the interests of contractors and the construction industry.

More DP Use

"Through feasibility and marketing studies, we will endeavor to compile information that answers such questions as why contractors are not making more use of computers; what must computer programming include to meet the needs of contractors; how can computerization be made practical for the small and medium-sized contractors; and how can contractors be assisted to perform their field reporting and internal record-keeping in a manner conducive to computerization," according to Miss Reckner.

A maximum of 10 to 15 Industry Advancement Program contributing contractors will be accepted for the research program. Selection will be determined after careful evaluation of applications.

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Position Announcements

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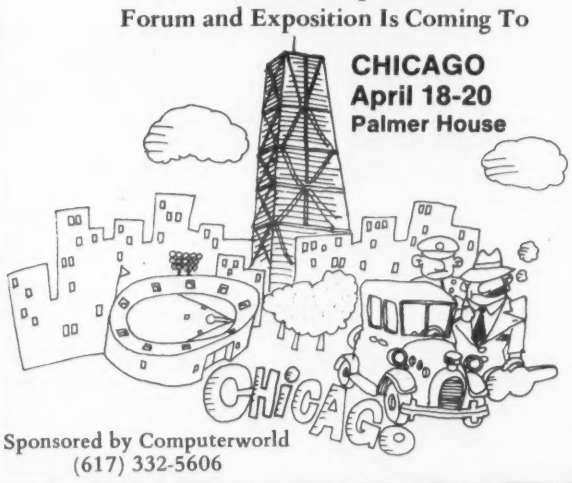

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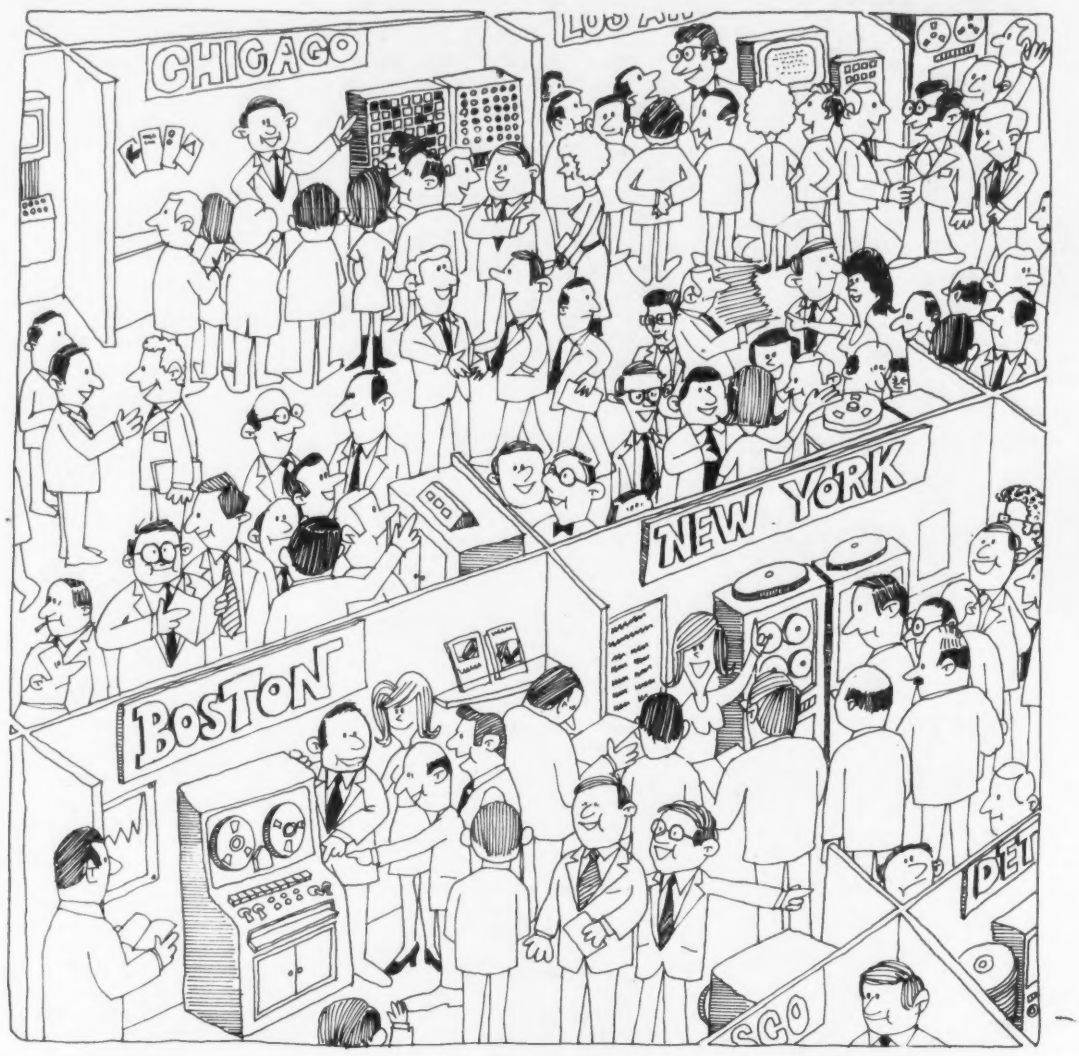

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computer industry

January 26, 1972 **a Computerworld news section about the nation's fastest growing industry**

CI Notes

DEC Mulls In-House Core

MAYNARD, Mass. – It appears that Digital Equipment Corp. is moving closer to producing its core memories in-house, a move designed to send shutters through OEM core memory suppliers.

Digital has announced it will purchase the RCA equipment used in the production and testing of core memory systems and has hired RCA's former manager of core operations, Dr. Henry P. Lemaire, to manage its memory operations.

If Digital decides to bring all core memory operations in-house, which it apparently will, it could be a major blow to OEM houses such as Ampex, Cambridge Memories and Electronic Memories and Magnetics, which have all supplied memory to DEC in the past.

Terms of the proposed deal were not announced.

Data General Reports Sales Up

SOUTHBORO, Mass. – Data General Corp. has reported sharp increases in sales and earnings for the 12 weeks ended Dec. 18.

Sales for the period were $5.3 million as compared with $2.2 million reported for the initial period last year. Earnings for the period were $659,000 or 25 cents per share, contrasted with the $220,000 or 11 cents per share after taxes reported for the comparable period last year.

Supershorts

Itel Corp. has formed a new Field Engineering Division to operate as part of the company's Data Products Group and to provide technical support to Itel's end-user and OEM-oriented activities.

– – –

Computer Terminal Corp. has received an order for the purchase of $2.7 million worth of Datapoint 2200 "intelligent terminals" and peripherals by Life Investors Inc.

– – –

The 6th Annual Instrumentation and Computer Fair will be held Sept. 6-7, at the Sheraton-Park Hotel, Washington, D.C. This year's fair has been expanded to include computers for the first time.

– – –

Proposals have been invited by the Electronic Systems Division of the Air Force Systems Command for automatic data processing equipment to be used by the Air Force Human Resources Laboratory. The equipment will support the Laboratory's Personnel Research Division and will be installed at Lackland Air Force Base, Texas.

– – –

Computer Automation is offering a Card Reader System as a peripheral to its 8- and 16-bit Alpha and Naked Mini computers. The system includes a Bridge 8000, 300 card/min card reader in a table configuration, and an interface controller which plugs into a standard prewired I/O slot in the computer's mother board. The cost of the system is $3,850.

IBM, Burroughs Set Records

3 Mainframe Makers Have Good Year

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – If the computer industry was judged solely on the performance of the leading mainframe manufacturers, then 1971 was not a bad year overall, with Burroughs, IBM and Honeywell reporting gains during the year.

At the start of the new year, IBM reported record revenues and earnings for the 20th year in a row, Burroughs announced a record year financially, and Honeywell said that the GE merger was beginning to pay off financially.

At the same time, however, it must be remembered that the independent peripherals manufacturers, the software and service firms, and other smaller segments of the business did not fare as well.

And while many of the mainframers were showing optimistic results, at least one, Xerox, reported disappointing results.

While the firm as a whole set earnings and revenue records, it admitted that revenues from its computer operations were down 20% and that the unit lost money during the year.

IBM Record

Spurred by a strong fourth quarter, IBM ended another year in record-setting fashion.

Earnings for the year ended Dec. 31 rose 6% to $1.08 billion or $9.38 a share from $1.02 billion or $8.92 a share in 1970. Revenue totaled $8.27 billion, up 10.3% from $7.5 billion.

IBM World Trade Corp.'s share of the corporate earnings pie rose to almost 53%, to $568.9 million from just over 50%, or $512.5 million in 1970. World Trade's revenue of $3.41 billion accounted for more than 41% of total revenue, up from about 39%, or $2.93 billion, in 1970.

IBM earnings for the last quarter increased 11.2% on a 19.3% rise in revenues. Earnings climbed to a record $306 million or $2.66 a share from $275.2 million or $2.41 a share. Revenues rose to an all-time high of $2.38 billion from just under $2 billion in the fourth quarter 1970.

The fourth quarter results were far better than those in the preceding quarters. Earnings in the first quarter rose 8.9% over the corresponding period a year ago, were relatively flat in the second quarter, and registered a 2.7% rise, attributed primarily to a lower tax rate, in the third quarter.

IBM officials have warned that a high rate of outright sales rather than rentals boosts current earnings, whereas rentals spread earnings over a long period.

Burroughs Figures

At Burroughs Corp., Ray W. Macdonald, president, reported that net earnings increased 11% and revenue increased 6% in 1971.

Net earnings for 1971 were $74.2 million, or $4.03 per share, an 11% increase over 1970 earnings of $66.5 million, equal to $3.83 per share.

Revenue from Burroughs worldwide operations in 1971 was $943.3 million, a 6% increase over the 1970 revenue of $893.4 million.

Macdonald said rental and service revenue continued to show strong growth, increasing 18% in 1971.

Fourth quarter earnings were $33.6 million, up 13% over the 1970 fourth quarter earnings of $29.7 million.

Fourth quarter revenue was $294.6 million, an increase of 8% over last year's fourth quarter revenue of $273.8 million.

Macdonald said worldwide incoming orders for 1971 reflected a 9% increase over 1970. Orders for computer products were particularly strong, showing an increase of 18% over 1970. Orders for accounting machines, commercial minicomputers and small application machines increased 5%, he said.

Worldwide backlogs at year-end 1971, however, declined 6% below the 1970 backlog level.

Research and engineering expenses in the year were $47.4 million compared with $45 million in 1970.

In a beginning of the year backgrounder at Honeywell, E.C. Lund, vice-president, North American operations, said the merger has worked and "we have achieved the economies we envisioned and they are now beginning to pay dividends."

As to product lines, Lund said that sales of the 50 Series were "running slightly ahead of last year in the U.S. and well ahead of last year outside the U.S."

'Moving Very Well'

The G100 series, he said, showed higher growth rates outside the U.S. in 1971 than in 1970, and the smaller 200 Series systems are "moving very well in all geographic areas and are well ahead of last year's performance."

In the area of medium-size systems, which constitute the bulk of Honeywell business, "we find them doing better than last year outside the U.S. and . . . slightly behind in the U.S.," Lund said.

At the same time, he said that "the large systems arena has proved to be a solid success to us this year, running well ahead of last year's totals."

Bookings of minicomputers virtually doubled over the 1970 performance, Lund said, adding: "Although we are seeing minicomputers becoming more and more of a rental item as they are included in general purpose systems, 1971 revenue from minis was up from 1970."

Memorex, IBM End Squabble Involving Trade Secret Suits

SANTA CLARA, Calif. – Memorex and IBM have agreed to a settlement of their one-year old legal battle.

In the original suit, IBM claimed that Memorex had misappropriated IBM trade secrets. In a cross complaint, Memorex alleged abuse of the legal process by IBM and interference with Memorex's relations with its customers.

In the original complaint, IBM alleged that Memorex had hired former IBM engineers in an attempt to get trade secrets on the IBM 3330 disk drive.

The agreement declares that the suit's termination has occurred without admission by either party with respect to any legal or factual matter at issue.

No Money Payment

The termination of the suit involved no money payment by either party and no Memorex equipment products currently manufactured and marketed are affected by Memorex's agreement.

Memorex has agreed in the settlement not to deliver until after July 1, 1972, any next generation disk storage equipment embodying what IBM claims to be proprietary, confidential information and trade secrets.

Memorex previously announced that its initial shipments to end-users of its 3330-compatible drive, designated the 3670 Disk Storage System, will begin in the fourth quarter of 1972. The agreement will not affect this schedule.

Memorex has also agreed to observe certain guidelines in its recruitment and employment practices as they relate to IBM employees.

The termination agreement provides that Memorex's cross-complaint will be dismissed in this suit without prejudice, which means that Memorex's claims remain available to it.

IBM's complaint will be dismissed with prejudice, which means that IBM is barred by this settlement from again suing on those claims. Both parties have agreed not to file any legal action for damages against the other for one year.

Originally, the suit by IBM against Memorex had been seen as a part of an IBM "get tough" policy with the independent peripheral makers, a policy which also involved price cuts as well as legal action.

At the time of the Memorex suit, IBM also sued a former IBM engineer who had left to work for Information Storage Systems, another disk drive manufacturer. That suit has not been resolved.

IBM began deliveries of the contested 3330 drive last August, and none of the independents have yet started deliveries.

Several sources said last week that the settlement of the suit could indicate that IBM now feels that it has enough of a lead in deliveries of the units so that it does not need to take further legal action against potential competitors.

DP Market to Show Steady Rise in 1972, Univac Head Says

BLUE BELL, Pa. – The U.S. computer markets will show "a slow but nevertheless steady improvement" in 1972, according to G.G. Probst, president of Univac.

The total revenues of the U.S. computer manufacturers in 1971 reached approximately $12 billion, Probst said, and "may reach as high as $26 billion by the end of 1976."

He indicated the bulk of revenue would continue to come from general purpose computer systems, but indicated that "other markets which require special purpose systems and services are developing rapidly and will undoubtedly garner a larger share of the computer dollar during the next few years."

In 1971 the gross shipment of U.S. computer manufacturers totaled about $7.9 billion, up slightly from $7.4 billion in 1970, he said.

The value of shipments during the next few years "will increase about $1 billion annually," he added.

U.S. Computer Exports Top $1 Billion; Western Europe Was Largest Market

WASHINGTON, D.C. – U.S. exports of computers and parts totalled $1.025 billion for the 11 months up to the end of November, according to statistics published by the U.S. Bureau of the Census.

The figures, which show shipments of $97.7 million in November, down from the $101.6 million shipped in October, do not include shipments of U.S.-owned firms operating overseas, just the shipments from plants in the U.S.

Western Europe was the largest single market with shipments valued at $608 million in the 11-month period, according to the Department of Commerce unit.

Of that amount, members of the European Economic Community received computer equipment valued at $398.7 million, while the United Kingdom received equipment valued at $129.4 million and other European Free Trade Association Countries imported equipment valued at $64.1 million.

Canada was the next most active market for exports of U.S. equipment, receiving shipments valued at $126.6 million, followed closely by Japan, which received equipment with a total value of $120.9 million in the 11-month timespan.

Asian countries, excluding those in the Near East or South Asia, imported $56.8 million worth of U.S.-made computer equipment. Near Eastern countries imported equipment valued at $12.8 million and South Asian states had imports of $900,000.

The 20 Latin American countries imported equipment valued at $50.3 million, with most of that total going to members of the Latin American Free Trade Association, which received equipment valued at $49.6 million.

Communist areas in Europe received shipments with a total value of $6.4 million, the Bureau said, while communist areas in Asia received shipments with a value of only $100,000.

Australia imported $26.1 million worth of equipment, the figures indicate, while all of Africa imported equipment with a value of only $12.3 million.

During the same 11-month period, imports of computer equipment and other office machinery into the U.S. totalled $504.1 million, with imports of $46.6 million in November, down from the $48.1 million that came into the country in October.

Western Europe as a whole was the largest source of the imports, shipping equipment valued at $214.8 million to the U.S. during the period.

Of that amount the European Economic Community supplied equipment with a value of $140.2 million while the UK supplied equipment worth $34.1 million, a figure matched by imports from the other members of the European Free Trade Association.

Japan was the number two source of imports, shipping equipment worth $144.7 million to the U.S., while Canada shipped equipment valued at $96.2 million.

Imports from communist countries in Europe totalled $300,000, according to the Bureau's statistics.

Orders & Installations

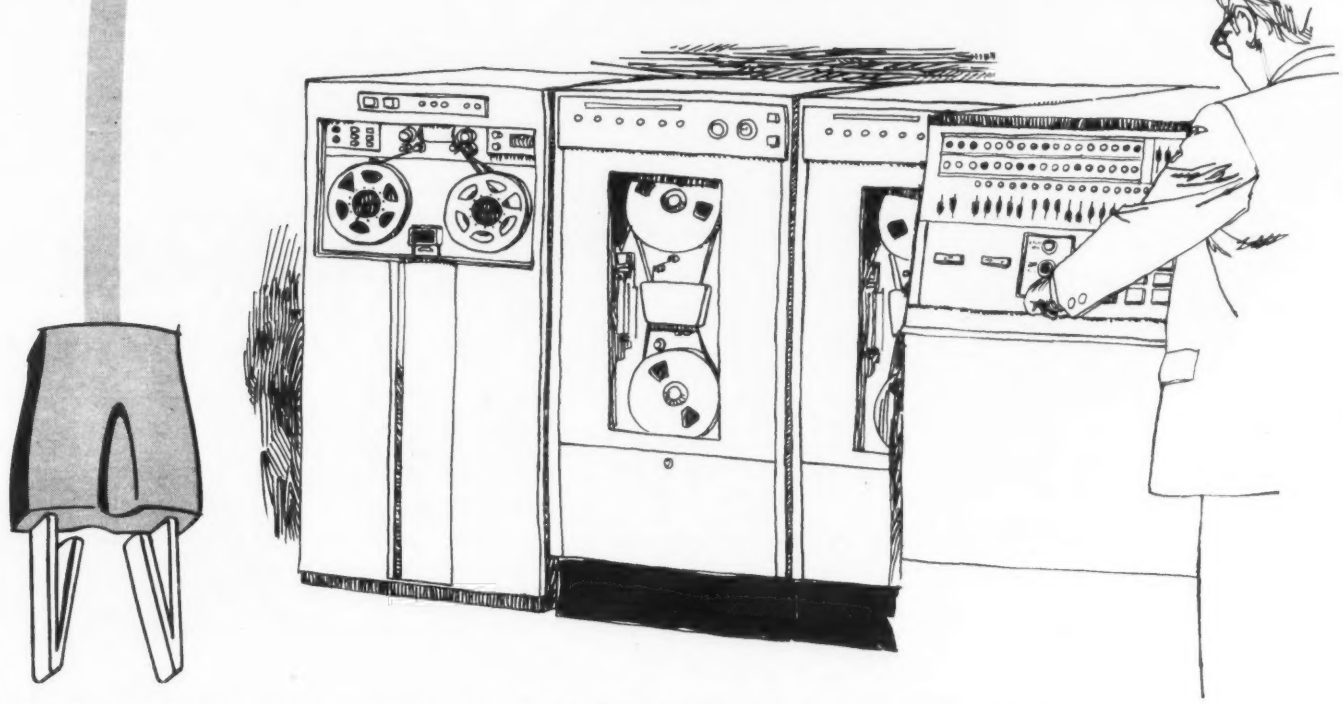
The Australian National University in Canberra has ordered a Univac 1108 computer system, which will be used for large-scale scientific tasks supporting research, high-volume student assignments and controlling a network of remote terminals at key points.

A Control Data 955 optical character recognition (OCR) unit was installed at the Instituut Voor Electronische Administratie, Rotterdam, The Netherlands.

A Honeywell Series 6000 and 40 Series 16 minicomputers have been ordered by the French National Railway, Societe Nationale Des Chemins de Fer Francais (SNCF), to implement a computer-controlled data transmission network.

Many things we lease aren't even electric...

(EXCEPT COMPUTERS)



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Proprietary Software Is Risky But Predictable Area

By Martin A. Goetz
Special to Computerworld

Prior to the mid-1960's, software was either internally developed or produced by computer manufacturers. Unfortunately, very little improvement in techniques from first to third generation programming had been made, resulting in generally poor, inefficient and unsatisfactory programs.

Further, no standards existed for program design, organization, coding, testing, documentation or monitoring. In effect, programming during the early 1960's remained very much an art, with negligible progress toward becoming a science.

All these factors contributed to increasing user dissatisfaction and ultimately paved the way for an entirely new concept — the "for sale" software package or "proprietary software."

From 1965 through 1968, several concerns with experienced personnel and the required resources established themselves as the first independent software houses. Proprietary software as an industry began to show promise. Among some of the more salient reasons underlying the significant interest aroused in this field were:

- Software packages were "djrt cheap" to manufacture, since all that was required was a tape copy.
- Several of the first proprietary software products on the market experienced immediate acceptance.
- Proprietary software appeared to be a rapidly growing field with low development costs and potentially high profits.
- Since proprietary software would eliminate the ever-rising costs of internal program development, user incentive to buy would be high.
- IBM announced its intention to unbundle, thereby theoretically eliminating the fear of "free" competitive products.

All of these factors triggered a great deal of optimism and speculation. The belief in the potential of proprietary software continued to grow until, by 1969, well over 100 companies had been founded solely to exploit this market.

Unfortunately, the anticipated boom has still not materialized. Today, many of the original software houses, financed by private and public stock issue, are defunct or have merged to survive. In most cases, several of the following misjudgments combined to contribute to their downfall:

- The actual proprietary development costs were considerably greater than had been estimated.
- The products were not sufficiently generalized to service as many different clients as envisioned.
- Companies underestimated both the need for a strong marketing force and the total cost for effectively marketing a software product.
- The proliferation of poor quality software packages caused confusion and eventual apathy on the part of the buyers.
- Under-financing and the recession of 1970 brought about financial ruin.

It is now clear that successful development of proprietary software involves dangers, uncertainty and setbacks comparable to those associated with oil prospecting or even gold mining. The analogy to these highly speculative fields, however, is not totally accurate.

It is true that proprietary software is a risky business, but a truer comparison can be made to the development and marketing of such highly technical products as television sets, computer hardware and accounting machines.

And herein lies justification for the following thesis: proprietary software development is a highly technical development area which, while somewhat speculative, is predictable and controllable only if sufficient technical expertise is available and the necessary resources for sales and maintenance efforts are allocated.

Conversely, if all the preliminary evaluations to select viable program products are not carried out, and if a commitment for the proper long-term investment is not feasible, the chances of success are questionable.

There is still a great deal of confusion about what constitutes a proprietary software package. A technically unsophisticated and uninformed individual might define a proprietary software package as a computer program for sale, with appropriate user documentation. This definition is correct in a limited sense; however, a computer program should have at least five additional characteristics before it can be viewed as a viable proprietary software product:

- It has a useful life of at least three years, with five to seven years more frequently expected.
- It can be sold to a particular user for a price considerably less than the total cost required for its development.
- It was developed to satisfy a variety of users.
- It was developed so that it could be enhanced.
- It must be able to withstand competition.

This is the first of a series of articles on the state of the proprietary software market by Martin Goetz, vice-president for proprietary software at Applied Data Research.

Microdata Unveils Line of Peripherals

SANTA ANA, Calif. – Microdata Corp.'s line of peripherals for use with the Micro 1600/21 minicomputer includes disk, magnetic tape and printer drives as well as paper tape and card equipment.

Moving head cartridge disks come in two configurations, 2.5 Mbytes priced at less than $12,000 and 5 Mbytes for $13,000. The magnetic tape system will handle 7- or 9-track IBM-compatible data at 10,000 char./sec. One transport with controller sells for $5,000. Price for a 150 line/min printer is less than $10,000.

The paper tape punch/reader unit punches 75 char./sec and reads 300 char./sec. A 300 card/min reader is also available. Both units are priced at $4,000. Delivery is 90 days from 644 E. Young St., 92705.

New OEM Products

Inspection Unit for Ferrite Core

GOLETA, Calif. – Applied Magnetics Corp.'s Model CIS-500 Magnetic Core Inspection Station is designed to perform high-speed inspection of ferrite magnetic head cores, measuring gap size, chips, pullouts and geometry.

Up to 500 cores can be loaded into the bulk feeder. They are automatically aligned and individually positioned under the microscope. After measurements are made, the core is ejected and the next moves into place.

Readings from 0 to 999 are displayed and a six-digit printer is included. X and Y axis measurements are displayed to the closest .0001 in. and are repeatable to three microinches. The device is available from 75 Robin Hill Road, 93017.

Bucode Has Autothread Transports

HAUPPAUGE, N.Y. – Bucode, Inc. has introduced the 4000 series of autothreading tape transports priced from $3,200. The units feature fully automatic loading, tape speeds to 125 in./sec and rewind speeds to 500 in./sec.

The two models are complete with NRZI and/or PE electronics and are packaged in a 19- by 24.5 in. rack-mountable unit. Model 4025 offers tape speeds from 75 in./sec to 125 in./sec with a rewind speed of 500 in./sec. Model 4005 provides tape speeds from 12.5 in./sec to 50 in./sec, with rewind speed of 150 in./sec.

The units provide fully automatic threading and loading of all standard reels through 10.5 in. diameter, and incorporate a "push-push" lever-action hub.

The transports feature single-capstan drive and a linear optical reel servo. Deliveries will begin during the first quarter from 175 Engineers Road, 11787.

Option Speeds Terminet Printout

LYNCHBURG, Va. – An optical closed loop parallel interface module for the OEM General Electric Terminet 300 teleprinter allows higher printout speeds, according to GE.

The module provides an interface permitting higher throughput by inputting data in parallel form, allowing the input rate of the printer to be controlled by the printer.

Actual printing speed to the Terminet 300 can be increased to as much as 40- to 60 char./sec from its normal maximum of 30 char./sec, GE said.

The module can be used when receive only Terminet 300s are used in relatively close proximity to the data source, GE said.

Datapac ROM Is DEC-Compatible

SANTA ANA, Calif. – A new 16K bit ROM system designed to be plug-compatible with Digital Equipment PDP-14 and PDP-16 is available from Datapac Corp.

The system, organized as 1K words of 16 bits each, attains access times of 200 nsec and cycle times of 500 nsec, and runs from a +5 V power supply.

The self-contained, decoded ROM includes data registers and all I/O lines are TTL compatible, Datapac said. Up to eight memories may be paralleled.

The unit is priced at under 2 cent/bit in OEM quantities from 18872 Redhill Ave., 92707.

Collins Offers Differential Analyzers

NEWPORT BEACH, Calif. – Collins MNOS Digital Differential Analyzers, designed to solve differential equations in real time, consist of three MOS/LSI arrays: quad serial summer, quad gated shift register and R-adder.

The arrays are fabricated using a P-channel enhancement mode technology. Circuitry is low-threshold dynamic two-phase. Prices each in lots of 10 units are: quad serial summer array, $26.40; quad gated shift register array, $18.60; and R-adder array, $26.55

Norlab Unit Prints 200 Line/Min

TORRINGTON, Conn. – The Model 40 print head from Norlab Industries is intended for use in hospital or lab measuring devices and computers used for monitoring applications.

The device can print up to 200 line/min of 13-char. and comes with a paper feed, ribbon control and sidewalls. The unit is priced at $18.64 from P.O. Box 795, 06790.

Ampex Forecasts $40 Million Loss

REDWOOD CITY, Calif. – Ampex Corp. said it expects a loss of about $40 million in the fiscal year ending April 29.

Current operations will account for about two-thirds of the loss, with devaluation of assets and the establishment of reserves in several areas responsible for the remainder, Ampex said. In fiscal 1971, the firm lost $12 million.

Although sales in the second quarter (ended Oct. 30, 1971) rose 11% to $82.3 million from $74.4 million in the same three months of 1970, Ampex recorded a loss of $2.6 million or 24 cents per share compared with earnings of $139,000 or 1 cent per share in the second quarter last year.

For the half year, sales totaled $155.3 million, up 12% from $139 million. A loss of $3.4 million or 31 cents per share compares with earnings of 136,000 or 1 cent per share for the first half of the previous year.

Ampex said it will adopt recent rulings by the Accounting Principles Board on the treatment of leased equipment retroactive to the beginning of the fiscal year.

The Computer Products Division, which introduced six new products in November, was profitable, sources indicated.

"We have undertaken a thorough division-by-division reassessment of Ampex and are restructuring the company to concentrate in the areas where the company has a proven record of profitability and technological leadership," President Arthur H. Hausman said.

EM&M Sees Loss From Write Off

LOS ANGELES – Electronic Memories and Magnetics (EM&M) said it plans to write off a $7.2 million loan to Semiconductor Electronic Memories Inc., Phoenix, thus giving EM&M a substantial loss for the year ended Dec. 25.

Electronic Memories has filed a petition of involuntary bankruptcy against Semiconductor.

For the nine months in 1971 EM&M earned $2.9 million, or 16 cents a share compared with $772,000 in the 1970 period. Final year-end figures for 1970 showed a loss of $14.3 million on sales of $92.6 million.

Semiconductor was a victim of a delay in demand for its product caused by an industry downturn and by pricing policies by other semiconductor memory makers, EM&M said.

Nickels & Dimes

Holders of **Viatron** common stock might want to frame their certificates. Viatron has been ruled insolvent by a U.S. District Court judge in Boston. The action means holders of common stock no longer have any interest in the debtor and are barred from voting on any plan of reorganization, according to R. Robert Popeo, trustee in proceedings for reorganization of the terminal maker.

$$$

Stockholders of American Research and Development will receive their very own shares of **Digital Equipment Corp.**, as well as Textron, if plans are approved for the merger of ARD and Textron. The agreement in principle calls for issuance of .6 share of DEC and .3 share of Textron for every ARD share.

$$$

Although **Mohawk's** second quarter revenues rose to a record $28.3 million and earnings included a $165,000 tax benefit, earnings in the half year slipped to $1.2 million from $1.8 million in the restated 1970 half.

$$$

Memory maker **Fabritek** managed to cut its second quarter loss to $430,841 from $618,961 in the same three months of 1970 despite declining revenues, which dropped to $3.4 million from $4.6 million a year ago.

$$$

Keydata, after its first profitable year, continued the trend in its first quarter, posting earnings of $98,000 or 4 cents per share compared with $50,000 or 2 cents per share in the same 1970 period.

$$$

Computer Investors Group, Inc. compiled record revenues and earnings for the nine months ended Dec. 31. Revenues totaled $8.9 million for the period, compared with $7.3 million last year. Earnings before an extraordinary credit were $1.3 million or 61 cents a share compared with $922,410, or 46 cents a share for the nine months last year.

TRADE*QUOTES

Computerworld Stock Trading Summary

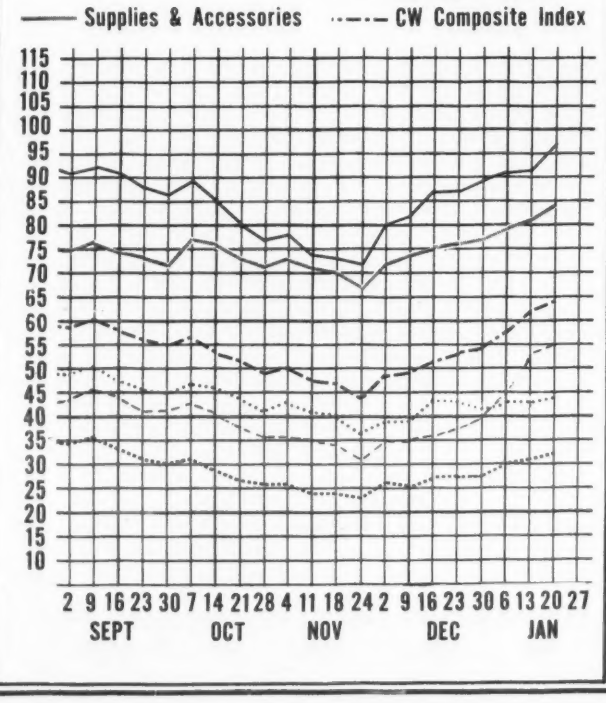
All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, JANUARY 20, 1972

EXCH		71-72 RANGE (1)	CLOSE JAN 20 1972	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 4	1 1/4	+ 1/8	+11.1
A	APPLIED DATA RES.	5- 13	6 3/8	+ 1/8	+2.0
O	APPLIED LOGIC	1- 3	2 3/4	- 1/4	-8.3
N	AUTOMATIC DATA PROC	44- 80	80	+1 3/4	+2.2
O	AUTO SCIENCES	1- 8	1/2	0	0.0
O	COMPUTER NETWORK	2- 11	7 1/4	+ 3/4	+11.5
O	COMPUTER PROPERTY	5- 11	6 1/2	+1 1/2	+30.0
N	COMPUTER SCIENCES	6- 17	8 5/8	+ 3/4	+9.5
O	COMPUTER TECHNOLOGY	4- 11	6 1/8	+ 1/8	+2.0
O	COMPUTER USAGE	5- 16	10 3/4	+ 5/8	+6.1
O	COMP AUTOMOT REPORTS	6- 13	9	+1 3/4	+24.1
N	COMPUTING & SOFTWARE	17- 45	24	+1 3/4	+7.8
O	COMRESS	1- 4	2 1/4	+ 1/2	+28.5
O	COMSHARE	4- 8	5 1/2	0	0.0
O	DATA AUTOMATION	1- 4	1/2	0	0.0
O	DATA PACKAGING	6- 10	6 1/8	- 1/8	-2.0
O	DATAMATION SERVICE	1- 3	3/4	0	0.0
L	DATATAB	4- 10	6 5/8	- 1/4	-3.6
O	EDP RESOURCES	5- 16	6 5/8	- 3/4	-10.1
A	ELECT COMP PROG	2- 7	3	0	0.0
N	ELECTRONIC DATA SYS.	34- 85	56 1/2	+ 1/4	+0.4
O	INFORMATICS	6- 15	9 5/8	- 1/4	-2.5
O	I.P.A. DATA CORP	1- 3	1 1/8	- 3/8	-25.0
A	ITEL	7- 23	10 1/4	+ 5/8	+6.4
O	KEANE ASSOCIATES	4- 14	6 1/2	0	0.0
O	KEYDATA CORP	5- 14	8	+ 7/8	+12.2
A	MANAGEMENT DATA	5- 11	6 1/4	- 1/8	-1.9
O	NATIONAL CSS INC	7- 14	11 1/4	+1	+9.7
O	NAT COMP ANALYSTS	1- 4	3/4	0	0.0
P	ON LINE SYSTEMS INC	7- 18	9 1/8	0	0.0
N	PLANNING RESEARCH	10- 26	14	- 1/2	-3.4
O	PROGRAMMING METHODS	16- 29	23 1/4	- 1/2	-2.1
O	PROGRAMMING & SYS	1- 4	1 7/8	+ 1/8	+7.1
O	SCIENTIFIC COMPUTERS	2- 4	4	- 1/8	-3.0
O	SIMPLICITY COMPUTER	1- 4	3	- 1/8	-4.0
O	SOFTWARE SYSTEMS	1- 3	1 1/2	+ 3/8	+33.3
O	TRS COMPUTER CENTERS	4- 9	4 5/8	+ 7/8	+23.3
O	TOLLEY INTL CORP	3- 8	7 3/8	+ 1/4	+3.5
O	TRACOR COMPUTING	2- 5	2 3/8	- 1/8	-5.0
O	TYMSHARE INC	4- 15	7 1/8	- 7/8	-10.9
O	UNITED DATA CENTER	2- 7	6 1/4	+1	+19.0
N	UNIVERSITY COMPUTING	14- 38	13 1/4	+ 3/8	+1.9
A	URS SYSTEMS	5- 11	6 1/2	- 3/8	-5.4
O	VORTEX CORP	2- 6	4 1/4	- 1/2	-10.5
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	24- 48	37 3/8	+3 5/8	+10.7
O	ALPHANUMERIC	1- 6	7/8	- 3/8	-30.0
N	AMPEX CORP	10- 25	11 1/8	+ 1/8	+1.1
O	ANDERSON JACOBSON	5- 10	7 1/2	+2 1/8	+39.5
O	ATLANTIC TECHNOLOGY	3- 8	5 1/2	+2 1/8	+62.9
A	BOLT,BERANEK & NEW	4- 8	7 1/8	+ 3/8	+5.5
N	BUNKER-RAMO	6- 17	10 1/8	+1 1/4	+14.0
A	CALCOMP	14- 33	20 5/8	+1 1/2	+7.8
O	COGNITRONICS	2- 9	2 3/4	0	0.0
O	COLORADO INSTRUMENTS	2- 8	2 1/4	+ 1/4	+12.5
O	COMPUTER COMMUN.	5- 19	5 7/8	- 1/8	-2.0
A	COMPUTER EQUIPMENT	3- 7	3 5/8	- 1/8	-3.3
A	COMPUTEST	4- 20	6 7/8	+ 3/8	+5.7
O	CONSOL COMPUTER LTD.	1- 12	1/2	0	0.0
A	DATA PRODUCTS CORP	3- 10	5 5/8	+ 1/2	+9.7
O	DATA RECOGNITION	3- 8	4 1/2	+ 1/4	+5.8
O	DATA TECHNOLOGY	3- 9	3 1/8	- 1/2	-13.7
O	DIGITRONICS	2- 8	3 1/4	- 1/8	-3.7
N	ELECTRONIC M & M	5- 16	6 5/8	+ 3/4	+12.7
O	FABRI-TEK	2- 4	3 7/8	+1 1/4	+47.6
O	GENERAL COMPUTER SYS	6- 10	9 1/2	- 1/2	-5.0
N	GENERAL ELECTRIC	53-124	63 1/4	+ 1/8	+0.1
O	INFOREX INC	17- 49	31 1/4	-2 1/4	-6.7
O	INFORMATION DISPLAYS	3- 8	4 1/4	- 3/8	-8.1
O	MANAGEMENT ASSIST	1- 2	7/8	0	0.0
A	MARSHALL INDUSTRIES	7- 27	10 1/8	-1 1/2	-12.9
N	MEMOREX	20- 78	31	+1 3/4	+5.9
A	MILGO ELECTRONICS	12- 26	20 1/2	+ 3/8	+1.8
N	MOHAWK DATA SCI	15- 47	22	+1 1/4	+6.0
O	OPTICAL SCANNING	6- 18	8 1/2	+ 1/4	+3.0
O	PHOTON	6- 12	9 5/8	-1	-9.4
A	POTTER INSTRUMENT	11- 25	18	+1 3/8	+8.2
O	PRECISION INST.	7- 16	9 3/4	-1	-9.3
O	RECOGNITION EQUIP	9- 26	12	- 3/4	-5.8
O	REDCOR CORP.	1- 9	1 7/8	- 1/8	-6.2
N	SANDERS ASSOCIATES	9- 22	16 3/8	+ 1/4	+1.5
O	SCAN DATA	6- 15	10 3/4	- 1/8	-1.1
O	TALLY CORP.	6- 16	10 1/2	+1 1/2	+16.6
N	TELEX	8- 22	13 3/8	+1 5/8	+13.8
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	9- 19	12 1/4	0	0.0
O	BALTIMORE BUS FORMS	6- 10	7 1/4	0	0.0
A	BARRY WRIGHT	7- 13	9 1/4	+ 5/8	+7.2
A	DATA DOCUMENTS	14- 29	19 7/8	- 5/8	-3.0
O	DUPLEX PRODUCTS INC	8- 14	13 3/8	+ 7/8	+7.0
N	ENNIS BUS. FORMS	5- 13	8 1/8	- 3/8	-4.4
O	GRAHAM MAGNETICS	9- 35	20 1/8	+1 7/8	+10.2
O	GRAPHIC CONTROLS	6- 15	12 1/4	- 1/4	-2.0
N	3M COMPANY	96-135	131 1/4	+ 3/4	+0.5
O	MOORE BUS. FORMS	36- 47	46 1/2	+2 5/8	+5.9
N	NASHUA CORP	20- 51	51 1/4	+2 3/8	+4.8
O	REYNOLDS & REYNOLD	37- 68	67 1/2	+5	+8.0
O	STANDARD REGISTER	14- 23	18	- 1/4	-1.3
O	TAB PRODUCTS CO	8- 17	16 1/2	+2 1/4	+15.7
N	UARCO	23- 34	27 3/4	+1 1/4	+4.7
A	WABASH MAGNETICS	5- 10	7 5/8	- 1/2	-6.1
N	WALLACE BUS FORMS	18- 26	23 3/8	+ 1/4	+1.0
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	105-160	149 5/8	+1 1/4	+0.8
N	COLLINS RADIO	10- 20	14 7/8	- 1/4	-1.6
N	CONTROL DATA CORP	34- 83	51 1/2	+8 1/8	+18.7
O	DATA GENERAL CORP	19- 65	61	+3 3/4	+6.5
O	DIGITAL COMP CONTROL	4- 24	21	+3 1/4	+18.3
N	DIGITAL EQUIPMENT	53- 85	77 7/8	+5 5/8	+7.7
N	ELECTRONIC ASSOC.	5- 9	6 5/8	+ 1/2	+8.1
A	ELECTRONIC ENGINEER.	5- 10	8 1/4	- 3/8	-4.3
N	FOXBORO	25- 46	35 3/4	+1 1/2	+4.3
O	GENERAL AUTOMATION	9- 26	17 1/4	+ 1/4	+1.4
N	HEWLETT-PACKARD CO	30- 50	48 7/8	+2 1/8	+4.5
N	HONEYWELL INC	83-137	140 1/2	+6 1/2	+4.8
N	IBM	284-364	363 1/2	+22 1/2	+6.5
O	INTERDATA INC	6- 11	8 3/4	+1	+12.9
N	NCR	25- 49	30 1/4	+1 3/8	+4.7
N	RCA	26- 41	38 3/8	+ 1/4	+0.6
N	RAYTHEON CO	27- 46	43 1/2	+1 3/8	+3.2
N	SPERRY RAND	23- 38	33 1/4	+1 3/8	+4.3
A	SYSTEMS ENG. LABS	7- 18	11 5/8	+ 3/4	+6.8
N	VARIAN ASSOCIATES	11- 18	15 5/8	+1 5/8	+11.6
N	VICTOR COMPTOMETER	12- 27	18	+1 1/8	+6.6
N	WANG LABS.	29- 50	37 3/8	+ 1/2	+1.3
N	XEROX CORP	85-127	125	+3 1/2	+2.8
	LEASING COMPANIES				
A	BOOTHE COMPUTER	11- 27	14 1/2	+1 3/8	+10.4
O	BRESNAHAN COMP.	2- 4	2 1/2	0	0.0
O	COMPUTER EXCHANGE	1- 9	1 3/4	- 1/2	-22.2
A	COMPUTER INVSTRS GRP	7- 14	9 5/8	+ 1/4	+2.6
N	DPF INC	8- 19	11 3/4	+2 5/8	+28.7
O	DATRONIC RENTAL	2- 4	2 3/8	0	0.0
A	DCL INC	5- 13	8	- 1/4	-3.0
A	DEARBORN-STORM	12- 23	18 5/8	- 3/8	-1.9
A	DPA, INC.	4- 9	5 1/4	+ 3/8	+7.6
A	GRANITE MGT	7- 13	8 7/8	0	0.0
A	GREYHOUND COMPUTER	7- 11	9	+ 3/8	+4.3
N	LEASCO CORP	16- 26	21 1/4	+1 3/8	+6.9
O	LECTRO MGT INC	2- 5	2 5/8	- 1/4	-8.6
O	NCC INDUSTRIES	3- 9	8 1/2	+ 1/4	+3.0
A	ROCKWOOD COMPUTER	3- 9	4 3/8	+ 1/8	+2.9
O	SYSTEMS CAPITAL	3- 7	3 3/4	+ 1/8	+3.4
N	U.S. LEASING	16- 39	38 1/4	0	0.0

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



Earnings Reports

UNITED DATA CENTERS
Nine Months Ended Sept. 30

	1971	1970
aShr Ernd	$.12	$.07
Revenue	2,478,063	2,141,258
Tax Cred	15,000	45,000
bEarnings	131,704	112,242

a-Based on income before tax credit. b-Equal to 14 cents a share in 1971 and 12 cents a share in 1970.

AGS COMPUTERS
Nine Months Ended Sept. 30

	1971	1970
Shr Ernd (Loss)	$.06	$(.05)
Revenue	1,062,795	779,262
Earnings (Loss)	26,665	(20,037)

NATIONAL SEMICONDUCTOR
Three Months Ended Dec. 12

	1971	1970
Shr Ernd	$.26	$.02
Revenue	13,934,000	7,996,000
Earnings	454,000	25,000
6 Mo Shr	.52	.22
Revenue	28,035,000	19,722,000
Earnings	896,000	356,000

On a fully diluted basis, per-share earnings were 25 cents a share in the three months and 50 cents a share in the six months of 1971, compared with 2 cents and 22 cents, respectively in the like periods of 1970.

DPF
Six Months Ended Nov. 30

	1971	a1970
Shr Ernd	$.56	b$.72
Revenue	22,605,000	24,144,000
Spec Chg	.....	448,000
Earnings	2,271,000	c2,473,000

a-Restated. b-Based on income before special charge. c-Equal to 61 cents a share.

RECOGNITION EQUIPMENT
Year Ended Oct. 31

	1971	1970
Revenue	$38,927,000	$34,723,000
Spec Item	a927,000	b5,599,000
Earnings	c487,000	10,913,000

a-Credit of $138,000 gain from translation of foreign currency and $918,000 gain from tax loss carryforward credit less a loss of $129,000 from sale of an investment. b-Debit; write-off of $4,786,000 from previously deferred research and development costs and provision of $2.4 million for possible loss on investment in affiliated companies less a gain of $1,587,000 from sale of majority-owned subsidiary. c-Equal to 10 cents a share.

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3. Dynamic Partition Balancing: GRASP/II continuously monitors the relative CPU usage of all partitions and will adjust the DOS priorities for maximum throughput. This will also prevent the shutting out of lower priority partitions in cases where higher priority partition is substantially CPU bound.

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Company_____

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City_____ State_____ Zip_____

TELEPHONE: AREA CODE:_____/_____